COAL AGE

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The Organization of Time

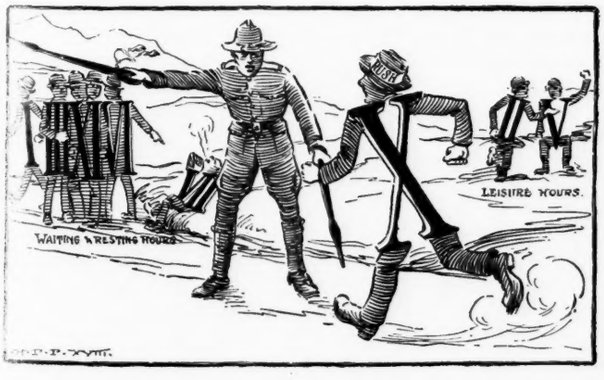
By Floyd W. Parsons

OF ALL things leading to individual success none is so important as the systematic and effective use of all the hours in each day. The only kind of man who can step out from the crowd and become a leader is the fellow who has so organized his time that no minutes are squandered.

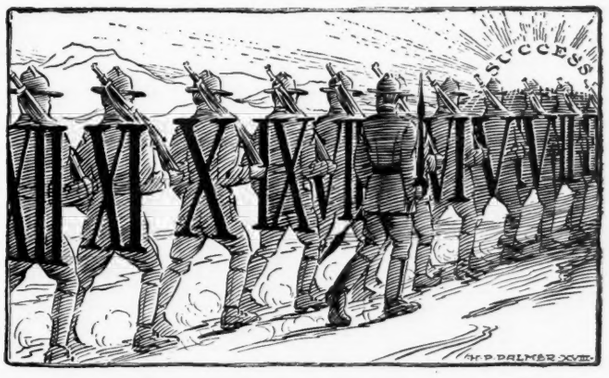
Time never works, but it does eat, rust and destroy. It gives us, however, the opportunity for accomplishment. We may regain wealth by economy, knowledge by study, and health by temperance, but lost time is gone forever.

The man who is choice of his time is always choice of his company and his actions. Often it is only for a moment that the favorable instant is presented. Miss it, and months and years are lost. A stray five minutes may easily contain the event of a life. Successful men have ever been misers of moments.

All systematizing of human effort, of course, shall be based on Nature's laws. There must be hours for rest and play, so as to invigorate brain and body and give them a renewed appetite for labor. People who work best should play best—leisure is just as needful as is activity. However,



THE MAN WHO LACKS CONTROL OF HIS TIME WILL NEVER CLIMB HIGH



A PROPER MARSHALING OF THE HOURS REMOVES ALL OBSTACLES ON THE ROAD TO SUCCESS

recreation must be rational; it must have its limits and its place on each man's self-arranged daily schedule.

Success does not depend on the amount of work done, or on the number of things accomplished, but on the importance of what we do. Many men who fail do enough, but they labor at haphazard. A few jobs finished is far better than many jobs not completed. We must select the right things to do and do them when the results count for most.

Discipline in the administration of time is vital. Precepts are but theory. It is discipline that cultivates self-respect and obedience, and the best discipline is always combined with freedom, mildness and sympathy. The man who lacks self-discipline certainly cannot command others.

To get the most out of each hour requires concentration. The man who defers concentration, waiting for something important to turn up, will be unable to master the situation when the big moment arrives. Only by practice can one prepare. Not until we can shut out from our minds all ideas irrelevant to the problem immediately before us are we prepared to play a major role in life. Divided attention means broken force. No man can organize his time before he is able to focus all his energies on one point.

IDEAS AND SUGGESTIONS

Check on Explosives for Miners' Use

BY R. W. MAYER
Connellsville, Penn.

The distributing powder houses are situated near the mine entrance at the mines of the United States Coal Co., of Gary, West Virginia.

The miners pass these houses on their way to work, before entering the mine. Each mine has a distributing house, which is in charge of a man licensed to handle explosives, and also a clerk. The licensed man issues the explosives and detonators to the miners in the quantity called for, and the clerk takes the miner's name and payroll number, together with the number of detonators and sticks of explosives issued to him. The miner buys stamped brass checks at the store, or commissary, which he gives in exchange for the explosives issued to him. Each check calls for a certain number of detonators or sticks of explosive.

Each mine is divided into from six to ten districts, according to the size of the mine. An assistant mine foreman has charge of each of these districts or sections. He is in his section before any miner is allowed to enter it. He meets the men at the entrance to his section of the mine, and enters on a report sheet the amount of explosives each miner carries into the mine for that day. The distributing powder house is closed before the starting time of the mine.

The time of closing varies with the extent of the workings of the different mines. It is regulated so that a miner, after receiving his explosives, will have time enough to get to his working place before starting time, so that the amount of his powder may be checked up by the assistant foreman. The assistant foreman fires all the shots. The miner drills the holes, prepares the clay tamping and charges of powder, but does not load the holes. He also stretches out the shooting cable. Each miner has his own shooting cable. He has everything in readiness for loading the holes and firing the shots. The shots are all fired by detonators and batteries. The tamping material is a dry clay. This clay is poured into paper cylinders, tubes or cartridges which are a little smaller in diameter than the drill hole. These paper cylinders are made by rolling a piece of newspaper around a cylinder-shaped stick of the proper diameter, one end of the stick being slightly smaller than the other end so the paper cylinder will slide off the stick easily. About 2 in. of the paper is allowed to extend beyond the small end of the stick. This extending end of paper is folded against the end of the stick, when the paper for the cartridge is rolled on the stick, closing one end of the cartridge. The larger end of the cartridge stick should extend beyond the paper to furnish a hand-hold for slipping the paper cartridge off the stick. The coal is undercut by electric chain cutters during the night. The miner, while waiting for the assistant foreman to come and fire his shots, cleans the "bug dust" out of his cut and loads it into cars, sets timber close up to the coal face and lays track up against the face of coal. When the assistant foreman shoots each miner's shots he enters on his report sheet the number of detonators and sticks of explosives used by the miner, and the amount of each he has remaining on hand. Sections are of such a size that he makes his round through the section a number of times and shoots the miners' shots on any of his visits during the day. The ventilation is such that the smoke from the shots doesn't annoy the miners. When the assistant foreman makes his last visit for the day and examines the miner's working place, he questions the miner as to how much explosives he'll require for the next day. If the estimate is reasonable, he enters it on his report sheet without correction. Otherwise he corrects the miner's estimate, although this rarely happens.

This estimate is turned over to the clerk at the powder distributing house, to guide him in issuing explosives to the miners the next morning. No miner is allowed to have issued to him more explosives or detonators than called for by the assistant foreman's estimate. This supervision of the amount of explosives issued, and when and where used, apparently works a hardship on no one, unless it would possibly be the one miner out of a hundred who would use the explosive for an illegal purpose.

GETTING AHEAD

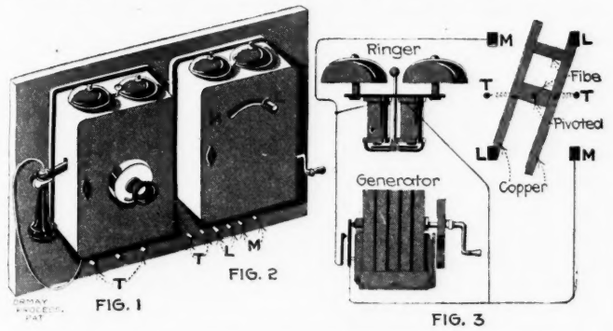
By WILLIAM GRIFFITH
SCRANTON, PENN.

THERE'S an ancient adage, time-worn and riven,
"Unto him who hath it shall be given";
But in modern days we say instead
"It's the man with a pull who gets ahead."
Now, if this is so, it is true, perforce,
That the needful thing is the pull, of course.
But when to secure it in vain you try
You'll find that the adage is all awry;
It must be reversed, like an "Irish Bull"—
It's the man with a *head* who gets the pull.

Combination Telephone System

By Frank Huskinson
Lafayette, Colo.

A telephone was needed in the superintendent's house that would communicate with various parts of the works. This residence already was provided with a local long-distance telephone, but no connection had been made with the mines and shops. The interior of the dwelling was finished and furnished in an artistic manner, and not wishing to install another telephone I made up the combination telephone system here described and illustrated.



FIGS. 1 TO 3. DETAILS OF TELEPHONE SYSTEM

In the accompanying diagrams, Fig. 1 shows the local long-distance telephone already installed, also the lines *LL*. I made up the neat box shown in Fig. 2 to match the one in Fig. 1, and had this just large enough to hold a magneto-generator and ringer coils, of the same capacity as those in use on the mine telephone system. I also made up and arranged a special switch and connections, see Fig. 3. This switch was mounted on the inside of the door of the box in Fig. 2. The details of this switch are as follows: *MM* are two switch contacts to which the mine telephone lines are connected; *LL* are two switch contacts to which the local telephone lines are connected; *TT* are the two terminals connected to the terminals *TT* in Fig. 1. These two lines are connected by a flexible connection to the two copper switch blades, which are held in position by the two fiber pieces. On one of these fiber pieces the switch blades are pivoted. On the other piece is the handle for changing the position of the switch from *L* to *M*, or from the local system to the mine system.

In Fig. 2 the switch handle is on the front of the box and the handle for the operation of the magneto-generator on the side. The telephone in Fig. 1 has no generator for signaling, as this type of telephone signals central when the receiver is removed from the switch hook.

In the working of this combination system the switch is always left in the position *L*, see Figs. 2 and 3. This leaves the telephone connected to the local long-distance lines *LL* and is always ready for use on this line. The ringer and the generator shown in Fig. 3 are connected to the mine telephone lines *MM*. This allows the signals from the mine telephone system to come in on the ringer (see Figs. 2 and 3); also, the mine telephone system can receive signals from the generator, Figs. 2 and 3. Any time that the signal is for the superintendent's residence, an answering ring is given, and the switch lever is moved from the *L* position to the *M* position, thereby disconnecting the telephone from the local lines *LL* and connecting it to the mine lines *MM*. As soon as the conversation is finished the switch is moved back to the *L* position, thereby disconnecting the mine lines and connecting the local lines.

The telephone, Fig. 1, and the combination box, Fig. 2, are mounted close together. This is a type of installation that can be used to advantage in many places. It is considerably cheaper than two separate telephones, takes up little room, is not conspicuous, and is just as reliable and satisfactory as two instruments would be.

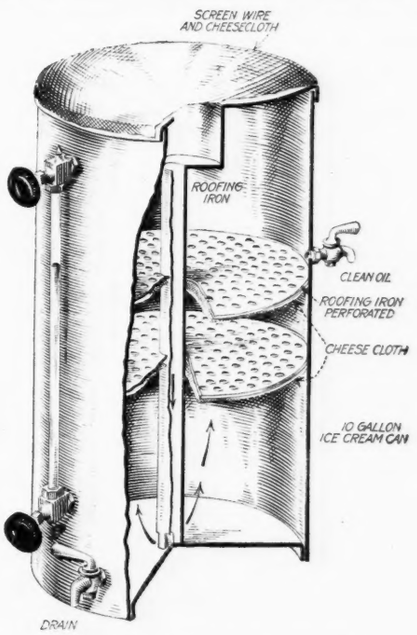
Homemade Oil Filter

By Jack L. Ball
Amsterdam, Ohio

Feeling the need of an oil filter for a fan engine which is situated quite a distance from the main engine room, but the prevailing high prices preventing the purchase of a new one, I made a filter myself. This was constructed as follows:

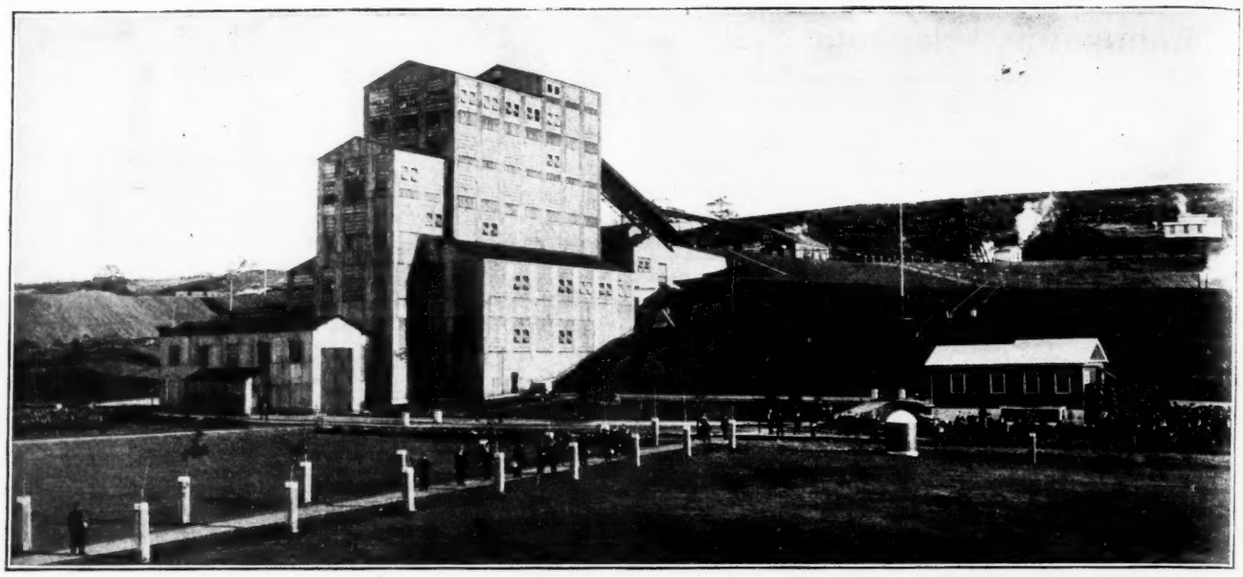
The materials used were an old 10-gal. ice cream can, scrap roofing iron, screen door wire and cheese cloth; the gage glass connections were fittings from an old lubricator; the only new parts purchased were two cocks, one gage glass and two yards of cheese cloth.

The filter, which is illustrated herewith, was made during spare time while on shift and the cost for materials was about $1. All joints were soldered, and the filter cloths and the like arranged so that when it is necessary to clean the filter all that one has to do is simply lift out the parts shown and clean them with steam. This device saves carrying considerable oil. Furthermore it cleans the used oil nicely. During cold weather it is placed on top of the steam chest, which assures warm oil.



EASILY MADE OIL FILTER

Excuses are a sort of mental roller skate that hurries a man backward in his business career.



Successful Steel Breakers of the Lehigh Valley Coal Company

BY GEORGE W. HARRIS
Editorial Staff of "Coal Age"

SIGNAL success in industrial lines is often decided by the substitution of modern for antiquated ideas. To the anthracite operator a breaker is a mill in which four to five million dollars worth of coal may be prepared annually for a period of 25 years or so. Why should it be built of wood anymore than mills of similar importance in other industries? The progressives among the anthracite men are building steel breakers and washeries. The Lehigh Valley Coal Co. has been a pioneer in the present movement, and its practice and that of the leading designer, fabricator and builder of such structures is given in the accompanying discussion. Conditions warranting the use of steel are noted—it is decided on a cost-per-ton basis—a matter of capitalization. Various considerations affecting the design of steel breakers are mentioned—shapes successfully used are noted. Preliminaries settled, the course pursued in the design of a breaker is given. The matter is viewed broadly. The occurrence of the coal in the mine is graphically shown by the sections of basins—supplementary notes cover details. All this information is important in the successful preparation of anthracite. Lehigh Valley practice at its various steel plants is given—in detail at the Franklin Colliery. Structural steel is an ideal material for the framework of a building. The number of successful steel breakers and washeries in existence and building indicate the way the wind is blowing in the anthracite coal region.

WHILE coming over the summit of the mountains above Wilkes-Barre, Penn., winding in and out among the ravines and low hills forming the topography of the top of the ridge, an unusual opportunity to view the country spread out before him is given to the traveler on the Lehigh Valley R.R. Should it happens to be one of those rare calm mornings of that peculiar state of the atmosphere when exhaust steam rises in a perpendicular column to a considerable height —what a sight is presented over the length and breadth of the Wyoming Valley.

To the mining man, these steam columns are most interesting. They mark the location of hoisting, breaker and fan engines, so necessary to the mining and preparation of the anthracite coal of the region of which Wilkes-Barre is the principal city. The coal operator realizes better than the layman the full significance of this expenditure of power. During a recent year the Wilkes-Barre district produced 5,533,967 tons of coal, of which 563,902 tons were used for steam and heat. This means that for every 100 tons of anthracite sent out from the breakers 12 tons are charged up to running expenses. No mean item of operation at the ruling price of coal. Each year anthracite requires more careful mining and preparation, the two going hand in hand when best results are attained. With the depletion of the better seams and the thicker ones, the thin beds and those containing a larger percentage of bony and slate partings are mined. This means an overhauling of out-of-date breakers, discarding of antiquated machinery, the installing of modern types and frequently the rebuilding of the whole plant. Breaker practice has undergone many changes to suit the requirements of mine and market. Possibly as striking a change as any is the substitution of more permanent building materials for the wood almost universally used in breaker construction not many years ago.

It was in the '90s that Coxe Bros. & Co. built its iron breakers at Drifton and Oneida collieries. This company was the pioneer in this respect, and the breakers attracted much attention. Built to minimize fire risk and cost of insurance, it was not long before the Oneida breaker was destroyed by fire. At that time the difference in the cost of iron and wood was a serious item and the new method of breaker construction received a decided setback.

To-day conditions are much changed, both as to the

relative cost of steel and wood and the sentiment about steel as a building material. At present there are 18 steel breakers or washeries in the Pennsylvania anthracite field, either constructed, building or being designed, distributed as follows: The Lehigh Valley Coal Co. leads with 5; the Delaware, Lackawanna & Western has 4; the Lehigh Coal & Navigation Co. has 2; the Pennsylvania Coal Co. has 2; the Lehigh & Wilkes-Barre has 1. The independent companies have 4, of which the G. B. Markle Co. has 2. Of these 18 structures 12 were either built or the material of which they were constructed was fabricated by the Guerber Engineering Co., of Bethlehem, Pennsylvania.

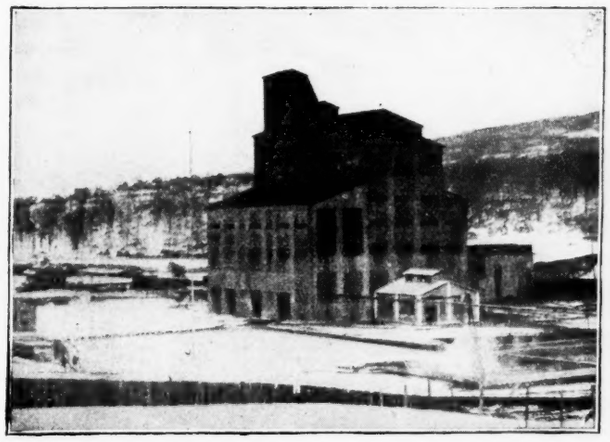


FIG. 1. FRANKLIN COLLIERY—CAPACITY 1500 TO 1800 TONS

It was not a complicated line of reasoning which influenced the coal operators—both bituminous and anthracite—to adopt steel as a material with which to construct their plants for the preparation of coal. It was the natural outcome of such conditions as the increasing scarcity and cost of timber, the decreasing cost of steel, its comparative permanency, inflammability and general adaptability for structural purposes. Structural steel lends itself particularly to conditions imposed on breakers and tipples. Such buildings are subjected to severe stresses which are satisfactorily met by steel structures; on the other hand rigid construction might be seriously weakened under similar conditions of service. Steel tends to spring back after a stress—unless the safe limit has been exceeded. If wooden structures are not made rigid, the joints rapidly deteriorate under racking stresses. If water works into the joints of timber framing, decay may proceed so rapidly as to necessitate replacement in a comparatively short time. This is true of many of the sticks in a breaker. The designing of steel breakers is a new field—there is little precedent to go by. A well designed wooden breaker might serve as a guide in proportioning various members of a steel structure. But new wooden breakers often have large excess of strength in some pieces of framing—especially in the case of sticks which it would be difficult to replace. In many cases a much larger piece of timber is used than necessary to carry any possible load to which they are subjected, largely to allow for probable decay in a few years. In this weakened condition the piece of timber is still supposed to have sufficient strength.

The Guerber Engineering Co. designs a breaker so that not more than 16,000 lb. fiber stress shall develop in any member. This gives a factor of safety of 4. In connection with factors of safety, a story is told about Prof. Mansfield Merriman, the well known authority on roofs, bridges and structural work in general. He was presiding over a meeting where a certain bridge was under discussion. Being asked what the factor of safety of the structure was, he replied "the grace of God." It so happened it was a notably weak bridge.

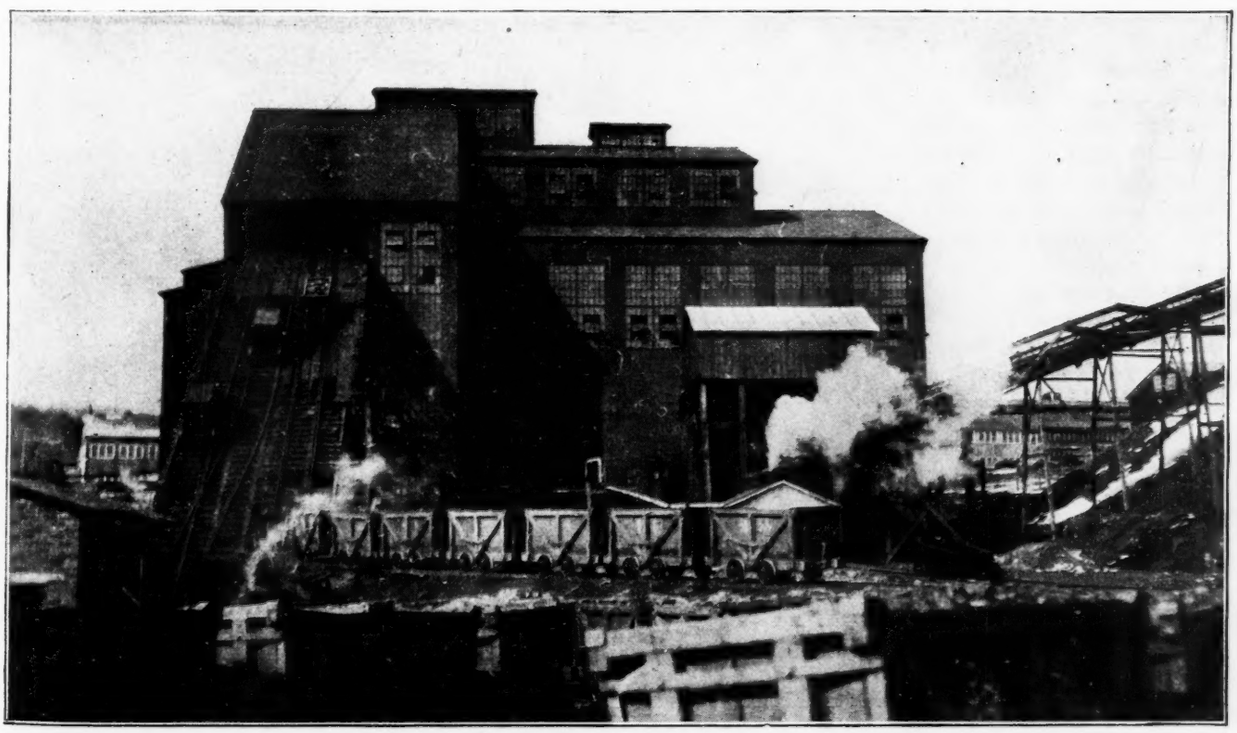


FIG. 2. DRIFTON BREAKER—ORIGINAL IRON BREAKER IS LEFT PORTION OF STRUCTURE

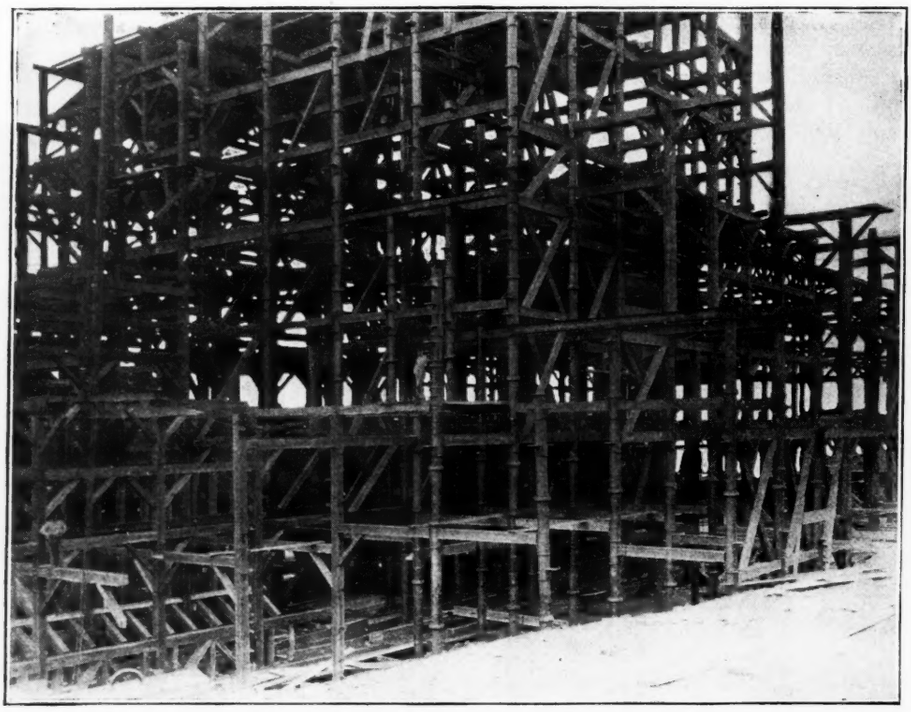


FIG. 3. FRAMEWORK DETAILS OF A WOODEN BREAKER

Figuring the loads in breaker design is a complicated problem. There are vibratory loads to consider, also variable ones. A floor may be calculated for specific load and later it will develop that the space may be used for machinery, bins of coal, etc. Machinery greatly complicates the load problem.

There should always be an economical flow of material through the breaker, yet keeping it confined to as small space as possible.

In ordinary steel buildings the floors are settled first and are continuous through one level. Not so in a breaker. Here the machinery is located and then the floors are placed to suit its requirements, being careful to have steel members not foul belts and shafts. The continuity of floors is much broken up and numerous platforms are required around machinery, etc., for the use of workmen. There is little opportunity for repeated work. The floors are at many and varied levels with no regularity.

It is customary to design a breaker from the roof down, the posts at the bottom being the last consideration. Also it is good practice to avoid complicated built-up work as offering possible crevices and cracks where moisture may sometimes enter and cause rust. Riveted work furthermore brings in the human element and an additional possibility of trouble from rust. The H column is the salvation of the breaker business. Other good sections used are beams where possible. In other words use a wide flange girder rather than a built-up section.

Breaker bracing is important and it may consist of either angles or rods. The latter type offers the advantage of adjustment at any time and rods do not take up as much room as angles. Bracing complicates connections, necessitating special design—standard connections cannot be used. Also machinery weighs and connections must be heavier than usual. This is important.

As in the case of any steel structure, breaker frames can be protected to advantage by some good paint. One or two good coats of a suitable protective paint will last for a long time. A good tar paint may be as desirable as anything—especially where wet conditions may exist. There are comparatively few breakers nowadays where coal is prepared dry. At the pockets steel should be well protected. The coal entering them is usually wet. Also it tends to wear off ordinary protection to columns and other steel members. The bottoms and sides of pockets are generally combinations of steel, cement and boards. The posts passing through pockets are often protected by cement with boards which were used as forms outside.

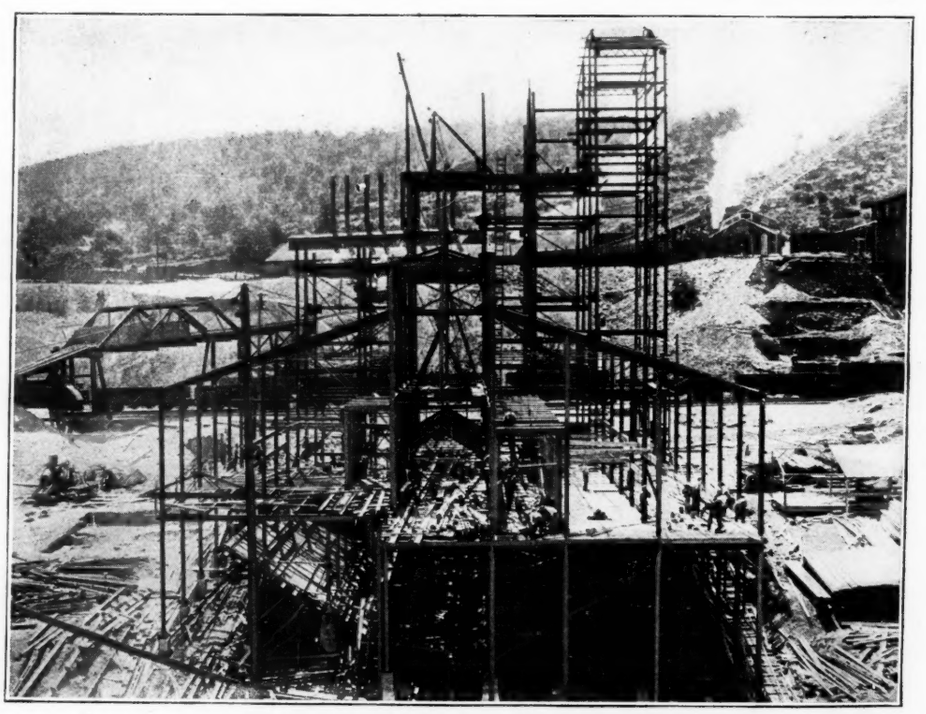


FIG. 4. PACKER NO. 5 STEEL BREAKER DURING CONSTRUCTION

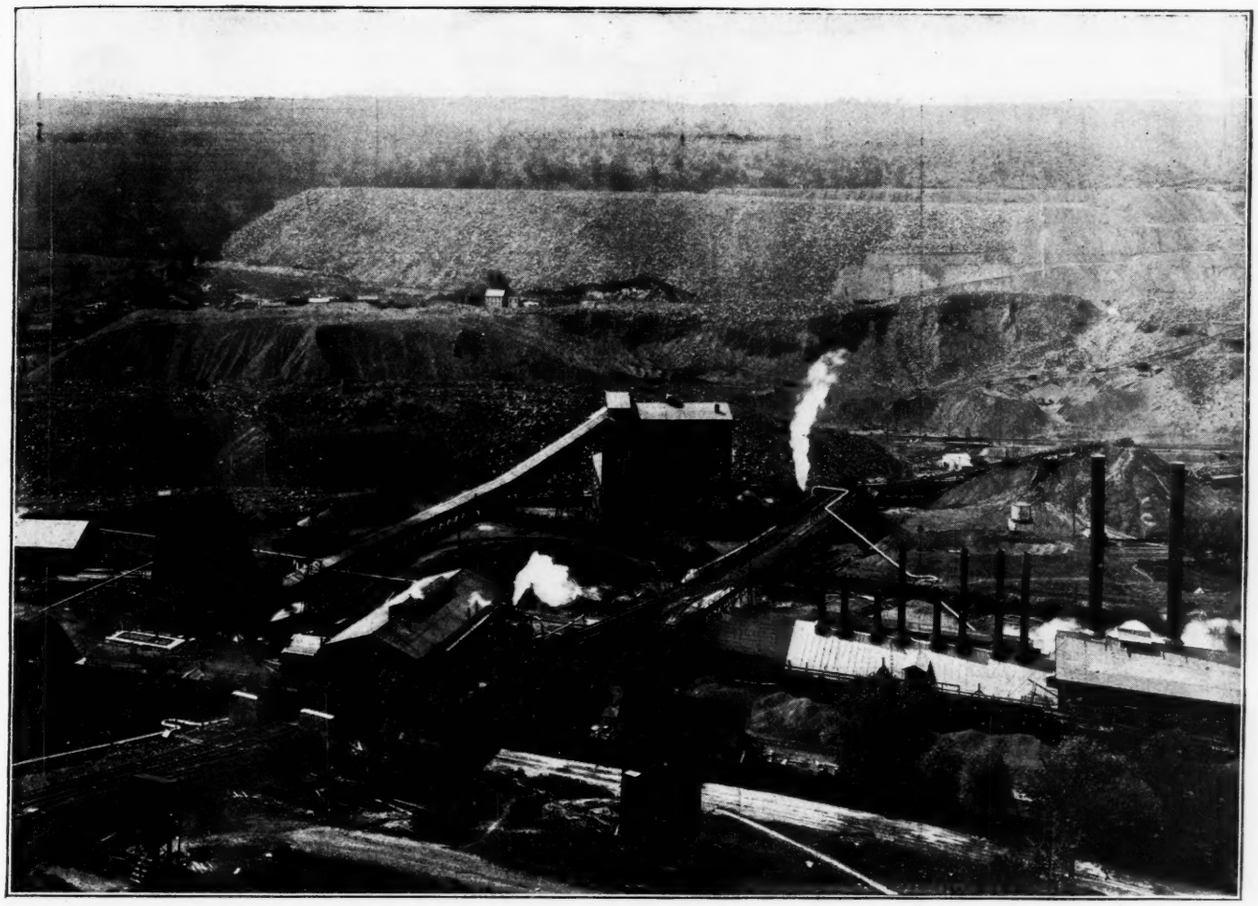


FIG. 5. VIEW OF PACKER NO. 5 PLANT—2500-TON BREAKER IN CENTER

As to the actual process of erection of steel breakers conditions are generally none of the best. In many instances it is a case of building a new breaker on or near an old site. Space for storing material is usually limited, as are also accommodations for labor. Some fine records have been made in steel breaker construction from design to erection.

At the best, the life of a wooden breaker is placed at 20 years—in many cases less. The annual depreciation in certain parts is extremely heavy—in the pockets and some heavy timbers it will amount to 25 per cent. And it is very difficult to replace some of these timbers. At present the tendency is to concentrate tonnage from various mine openings for preparation in a large breaker. In most cases this arrangement fixes the life of a plant at more than 20 years. There are some instances where limited, isolated workings have been cleaned up by a small plant. In this case a wooden breaker might fill the bill.

As to whether a breaker should be built of steel or wood is tersely expressed by the Lehigh Valley Coal Co. as a case of capitalization. Thus there is a certain acreage to be developed. The coal tonnage in the ground is estimated and the annual production at the proposed plant decided upon. Then the cost for both a wood and steel breaker is computed on a cost-per-ton basis. Add annual interest charges, sinking fund and maintenance cost. The cheaper is the one to build.

Repairs and replacements in wooden breakers can be very heavy. For example, a replacement of 60,000 ft. B.M. in one breaker was at the rate of $80 per M. In another case a 26,000 ft. B.M. replacement was at the rate of $117 per M. One breaker was remodeled at a cost of $119 per M for 331,000 ft. B.M. In another case $107 per M was paid for 447,000 ft. B.M. In still another breaker $178 was paid per M for 144,000 ft. B.M. In this last case there was considerable machinery to reset, but there was still a charge of $139 per M on woodwork alone. In all of the foregoing cases of remodeling there was included taking out old work, replacement with new and resetting machinery.

The Lehigh Valley breaker foundations are designed for one ton per square foot bearing on soil. The columns are spaced so that each will not exert more than 30 tons pressure on the foundations. The breakers of this company are generally riveted structures, but some of their washeries may have bolted connections on occasion. This latter matter introduces some nice questions of judgment into the discussion. Small structures when bolted can readily be taken down and moved from place to place—profitably in the case of washeries on a 10-mile limit. It is said to cost in the neighborhood of $30,000 to move an average washery, and that amount of cash will move a lot of coal.

Should a steel breaker be decided upon several methods are followed as to designing the structure. Sometimes the coal company furnishes a structural steel concern with plans giving location of machinery, chutes, pockets and other main features of the breaker or washery. In that case the steel company may design the structural

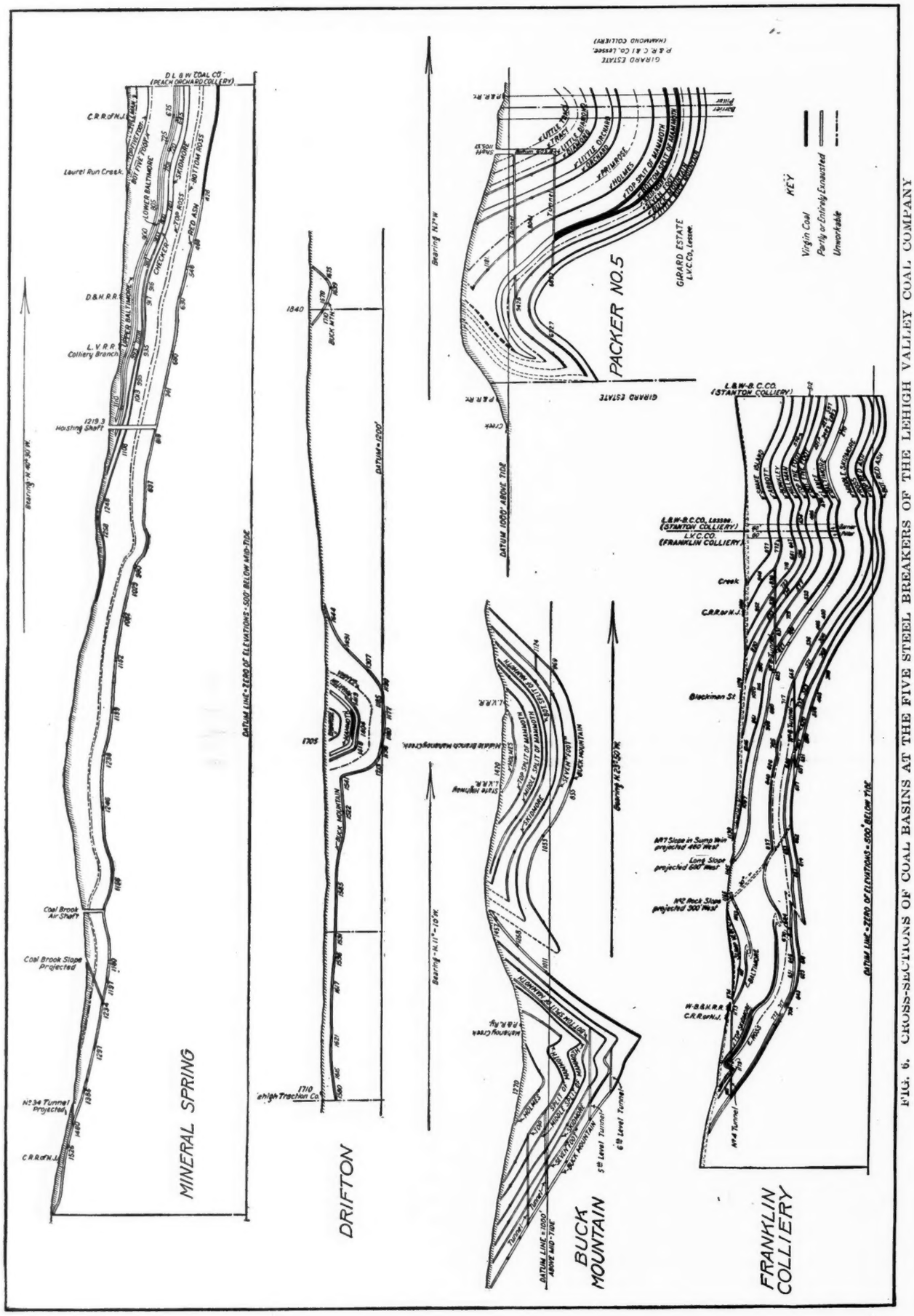


FIG. 6. CROSS-SECTIONS OF COAL BASINS AT THE FIVE STEEL BREAKERS OF THE LEHIGH VALLEY COAL COMPANY

frame, calculating stresses and working out details. From these plans the material can be fabricated. At other times, especially when the mechanical engineering department of the coal company is not swamped with other work, then they may prefer to work up complete plans themselves. A saving is effected by this method on the cost of structural material to the operator, but not necessarily on the total cost of the breaker. If the same concern designs, fabricates and erects the building, certain advantages attend. Coöperation benefits

flow sheet and settle on the daily output. The cost of the breaker should be reduced to a cost-per-ton basis, which is obtained by dividing the cost of the structure by the total estimated tonnage in the property.

Next the probable make-up of the shipments should be determined. Also the probable per cent. of each size. Suppose the following eight sizes are to be made: Broken, egg, stove, nut, pea, buckwheat, rice and barley. Should it be decided not to make broken coal, then add a percentage of each size to the next lower. Likewise in

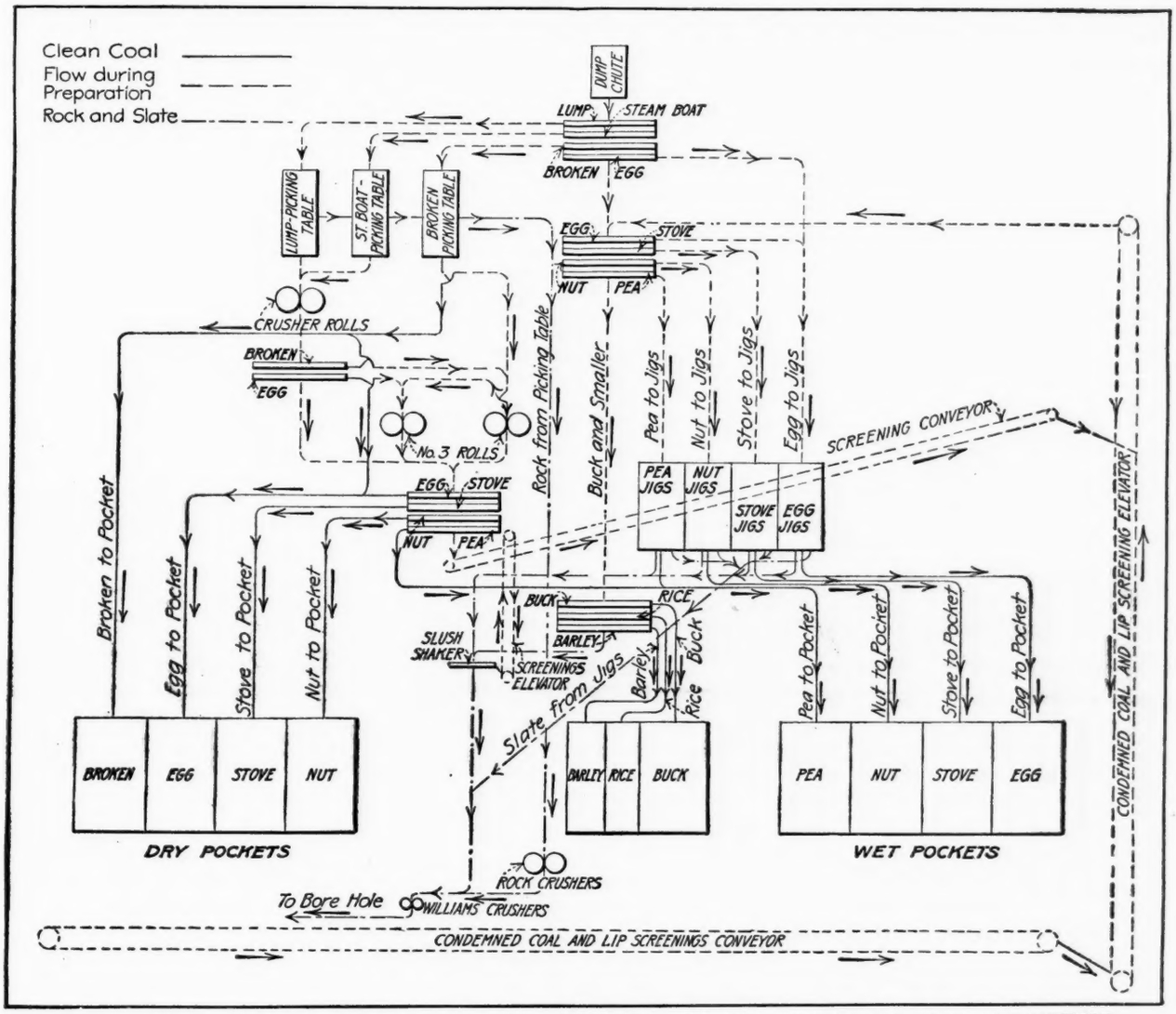


FIG. 7. FLOW SHEET OF THE FRANKLIN STEEL BREAKER, SHOWING TYPICAL WET AND DRY METHOD

may accrue in the design of practical shapes which are most economically fabricated in the shop and quickly erected in the field.

To a man who becomes completely absorbed in working out the many problems connected with the preparation of anthracite coal, the design of a breaker may be as interesting as reading a novel. As a preliminary in such an undertaking, Paul Sterling, mechanical engineer of the Lehigh Valley Coal Co., states that having a certain tract of coal on which to locate a plant, estimate the total tonnage which will likely be prepared over the proposed breaker; judge as to the probable character of the run-of-mine; sketch out the probable

the event that no broken or egg are to be made. When the sizes of coal to be made have been determined and the percentages fixed, then the machinery for preparation can be designed. Breaker capacity for a maximum of each size should be secured. Determine the area or size of shakers; number and size of rolls; number of jigs or mechanical cleaners and sizes of all elevators and conveyors. With this information, the horsepower required to run the breaker can be determined.

Finally a plan is necessary to show the arrangement and location of the various parts of the outside plant, including the breaker, shafts or other near-by mine openings. Also empty and loaded railroad tracks with

their "light" and "loaded" scales and any other accessory plant such as boiler houses, shops, etc. The method of putting the run-of-mine coal into the breaker will depend on a number of local circumstances. A tower-hoist, barney plane or conveyor line may be used, keeping in mind that every time coal is dumped, breakage of coal occurs. If the plant is steam operated, boiler fuel must be arranged for. An adequate and suitable water supply for boilers and for coal preparation is also an important consideration.

The disposition of refuse, whether it is to be pulverized and silted into underground workings or stocked on the surface, is an important matter. Large rock and slate banks nearly always are an accompaniment of anthracite mining and preparation. They frequently occcupy valuable surface and may contribute considerable additional weight to that bearing on mine pillars. In the past, slate, rock and culm have often been placed over coal which was near enough the surface to strip.

tions. They also emphasize the necessity of putting in bracing where it belongs. Where a steel beam connects to a column—that is, a riveted field connection—then a chair or support for the beam should be built up in the shop on the post. Rolled steel shapes are used rather than built-up sections in wet breakers. The following table shows the distribution of steel in two breakers among the various members according to the position in the building:

Breaker A:	Tons	Breaker B	Tons
Posts or columns	125	Columns	115
Beams	186	Beams, including pockets	183
Bracing	39	Stairs	10
Roof	22	Bracing	55
Girts	41	Roof	28
Stringers—Pocket	36	Girts	25
Rivets—Field, and rods	9	Rivets and rods	11
		Cast-iron chairs	3
Total	458	Total	430
The volume of the breaker is 640,000 cu.ft.		The volume of the breaker is 860,000 cu.ft.	

Conditions under which a bed of coal exists affect mining and preparation to a large extent. If the pitch

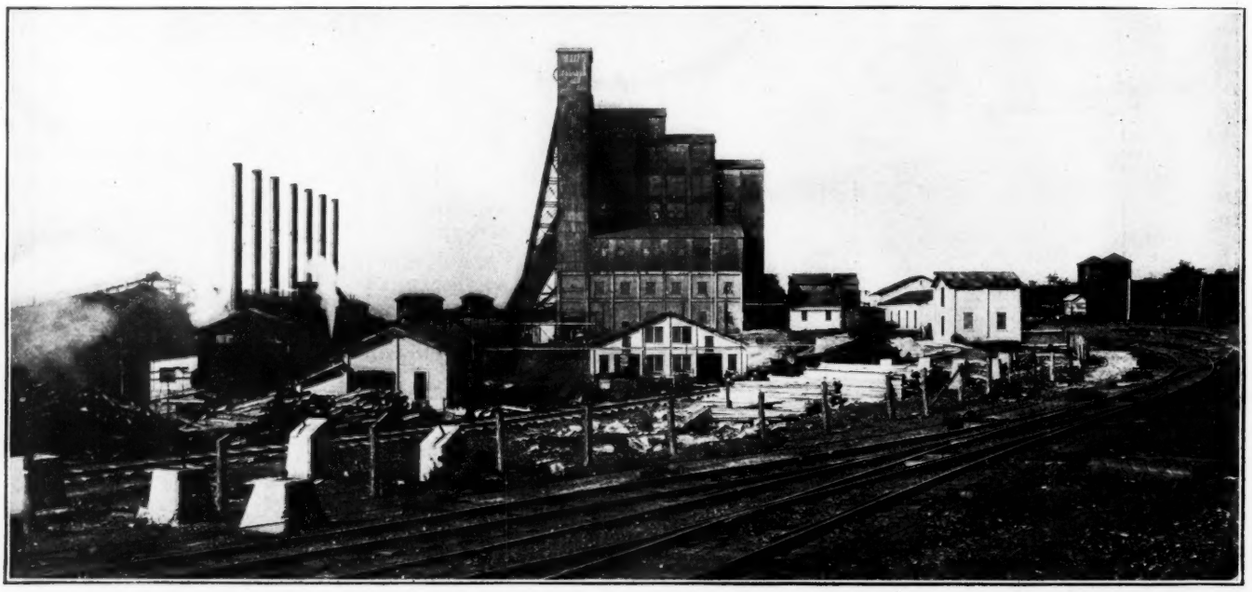


FIG. 8. BUCK MOUNTAIN BREAKER, THE FIRST STEEL PLANT OF THE LEHIGH VALLEY COAL COMPANY

The removal of refuse as a preliminary to stripping is now generally avoided. Each one of the many points thus briefly noted is worthy of a separate paper, but space limits their discussion here to little more than topical mention.

In connection with a more detailed discussion of the five steel breakers of the Lehigh Valley Coal Co., it might be interesting to note their location in the anthracite region and refer to the section of the basin at each plant. (See Fig. 6.) Of the five plants in question, Buck Mountain and Packer No. 5 are in the western middle field; Mineral Spring and Franklin are in the northern field and Drifton is in the eastern middle field of the anthracite region. In these breakers the preparation is wet in all except the Franklin, where both the wet and dry methods are used.

The Lehigh Valley people find many commendable features in steel breakers. Everything is open, there is good light and air and nothing hidden away in dark corners. The basis of the design of their first steel breaker was to secure steel posts which should be equivalent to a 12 x 12-in. wood post under similar condi-

is light so that the miners can take mine cars to the face and load them, then slate and rock can largely be gobbed in the chamber and comparatively clean coal be sent to the breaker. Even if there are partings in the bed and bad top overhead, quite a bit of coal can be cleaned inside. Contrast the foregoing conditions with mining on the heavy pitches, where practically everything is loaded out—partings, falls of roof and coal all go to the chute and into the mine car. In extreme cases a mine car may contain 40 and even 50 per cent. of refuse.

Coal is often dirty. It is frequently wet, in addition, on account of water finding free entry to the workings through crop falls and cracks in the strata. Such adverse conditions greatly handicap both mining and preparation—especially the latter. Fig. 6 shows at a glance what the various collieries in question likely have to contend with. The breaker proposition may vary greatly with differences in pitch, purity of the seam and condition of top.

Before referring to the individual steel plants, it should be stated that all the breakers contain more or

less wood in their construction. Chutes, some machinery foundations and pocket linings (bottoms and sides) are of wood. In the case of pockets, the stringers are I-beams; lengthwise on these beams are 3 x 8-in. sticks; across these are other 3 x 8-in. timbers on 14-in. centers; and on top of all are 2-in. plank running with the pitch. On top of the plank is two-ply roofing paper, then ⅞-in. T. & G. boards, and finally 1-in. hardwood boards.

The Buck Mountain breaker, Fig. 8, was described fully in articles appearing in the May 18 and 25, 1912, issues of *Coal Age*. It has a daily capacity of 1800 tons. The breaker contains 477 tons of steel and 386,000 ft. B.M. of timber. Below the jig floor concrete was used in its construction. By reference to the section of the basin at this colliery, Fig. 6, it is seen that the pitches of the seams are heavy, notably so on the south dips. The seven seams mined are in good condition and the top is generally good.

Packer No. 5 breaker is shown under construction in Fig. 4 and completed in Fig. 5. It is the largest steel breaker of the Lehigh Valley Coal Co., having a capacity of 2500 tons. In addition to the steel, there is 690,000 ft. B. M. of timber in the building. In Fig. 3 is illustrated the framework of a wooden breaker. Note the mass of timbers extending in almost every direction and then contrast this construction with the apparently slender structural steel frame of Packer No. 5, shown in Fig. 4. Some of the many advantages of steel over wood for breaker building have been brought out previously. In the wooden frame, Fig. 3, it is interesting to note early tendencies to substitute metal for timber. Here some of the columns are of cast iron and there are a few iron or steel beams in the breaker.

Returning to Packer No. 5, the following seven seams are mined: The Diamond, Little Orchard, Orchard, Holmes, Mammoth, Seven Foot and Buck Mountain. The first three beds have bony and slate partings and a soft slate top. The remaining four seams generally occur in good condition, which is a fortunate circumstance for the pitches are very heavy. The seams at Packer No. 5 are thicker than those at Buck Mountain colliery.

Site of Pioneer Iron Breaker

The Drifton colliery of the Lehigh Valley has always been a most interesting plant. From the earliest years in its history until the death of Eckley B. Coxe, it was his special pride and many of his experiments in mining and preparation of coal were carried out here. The extensive shops of Coxe Bros. & Co. were at this place. Here Mr. Coxe built the pioneer iron breaker which the Lehigh Valley Co. added to recently. It was described by E. P. Humphrey in a paper read before the American Institute of Mining Engineers. This paper was published in the Mar. 30, 1918, issue of *Coal Age*. The original iron breaker is shown in Fig. 2 as the narrow portion and three track plane at the left of the structure. The addition is at the right, and it occupies the site of the old lump coal chute, discarded at the time the breaker was remodeled.

The seams mined at Drifton are the Mammoth, Wharton, Buck Mountain and to a limited extent the Gamma. There have been extensive strippings at this plant on the Mammoth seam. The gunboats which are to be seen on the breaker plane indicate steep pitches in the mines, and the Drifton section bears out this idea. It is expected that this breaker will develop a capacity of 2500 tons daily.

The Mineral Spring breaker is shown in the headpiece. This plant was described in an article published in the Mar. 16, 1918, issue of *Coal Age*. Some of its special features relating to safety precautions were described in an article in the Dec. 8, 1917, issue of *Coal Age*. The capacity of this breaker is about 1600 tons daily. In constructing the breaker 553 tons of steel were used and 302,000 ft. B.M. of timber. The principal seam mined here is the Red Ash, which is thick and comparatively hard, but it carries bony coal, is dirty, and there is generally a heavy clod over the bed. In general the seams at this plant are thin and dirty.

Typical Wet and Dry Plant

The Franklin colliery of the Lehigh Valley company, Fig. 1, is a particularly interesting plant. The breaker is one of the newest of the steel type of this company and has a capacity of 1500 to 1800 tons. It is the only plant of the five in question which prepares coal by both the wet and the dry methods—it is typical of this process. There is a tendency to do away with the dry way as the wet is cheaper. Twelve different seams are mined at the Franklin plant. The best seam, the Baltimore, is practically exhausted. Among the others, the Hillman and the Red Ash occur in good condition. At times many of the seams are dirty and carry slate and bone partings, also poor roof. The section of the basin at the Franklin, shown in Fig. 6, gives a good idea of the general mining conditions as affected by pitch of seam, etc.

The early history of this plant is an interesting one. In 1868 a wooden breaker was built which replaced previous ones. At that time the company operating expected to have coal only for about 20 years. In '89 the Lehigh Valley replaced that breaker by a modern one with the expectation of its life being limited again by only 20 years available coal. In 1913 a steel breaker was built with the prospect of coal for the next 30 years. This illustrates the changes which have been brought about in anthracite mining as this coal becomes scarcer and thinner and poorer seams are considered profitable for mining.

The Franklin steel breaker was necessary to handle and prepare the coal now being mined—it is different from that previously worked. Also an up-to-date breaker was necessary on account of the development of beds which could not be prepared satisfactorily in the old structure. It would have been too expensive to rebuild the old breaker, and then the annual maintenance cost on the wooden structure would have been so heavy that steel was waranted. The new breaker has a ground area of 88½ x 96 ft. and a total height of 125 ft. The total weight of steel in the structure is 488 tons. The volume of the building is 640,000 cu.ft.; it is covered with galvanized, corrugated steel and has steel sash containing 8000 panes of 12 x 18-in. glass.

This breaker was built over old workings a portion of which it was necessary to silt to avoid settlement in the mines which would damage the breaker. The first car of steel arrived on the ground on Apr. 3, 1913, and the first car of coal was dumped on Oct. 3, 1913. Coal is

supplied from three openings and concentrated at the foot of a tower hoist. Coal is hoisted to the top of the breaker in self-dumping cages to a height of 115 ft. at the rate of 150 cars per hour. Broken, egg, stove and nut are prepared dry, and egg, stove, nut, pea and smaller sizes are prepared wet at the Franklin. The flow sheet (see Fig. 7) gives the details of how coal is handled in this breaker.

The system of loading coal here, by belt converyor, was introduced in the region by the Lehigh Valley. The coal pockets are at right angles to the loading track. A 36-in. belt is used which is run at a speed of from 300 to 500 ft. per minute, the rate of speed being in inverse ratio to the size of the coal. Belt loading uses less men than by the old method, cutting the labor item in half. Loading by belt costs 1c. per ton, while chute loading costs 1.6c. per ton. The cost of the belt itself amounts to 2 mills per ton on a tonnage of 350,000 loaded. A belt has loaded 5000 tons of coal in 10 hours. The loading is managed by one man, who operates levers controlling gates at the pockets. Another man places cars for loading. Where large tonnage is handled more men are needed to see that car movement—empty and loaded—is expedited.

Considerable thought was given the subject of breakage of coal in the design of the Franklin breaker. Small lowering conveyors are used for moving lump coal from shakers to lump coal picking tables. At the discharge end of each picking table is a shifting apron which prevents excessive breakage at that point. This latter device, as well as numerous other ingenious contrivances about this plant for saving labor and doing work better and safer, is the invention of James Piatt, the outside foreman at the Franklin colliery. All chutes have rounded corners and the movement of coal is largely regulated by automatic controls, developed at the Maltby colliery by the outside foreman, Nelson White.

All breaker refuse at this plant, after being collected, passes through a No. 6 Gates gyratory crusher which reduces it to about stove coal size. This product is then passed to a pulverizer which grinds it to ¼- to ½-in. size, when it is silted into the mines. The breaker is driven by a pair of 18 x 30-in. Corliss engines belt-connected to a main line shaft. The breaker is divided into two units—pure and impure sides—independently driven, a considerable advantage when handling condemned coal. The Franklin was designed for 1800 tons, but the best dump for 9 hours has been 674 mine cars. However, the best hour hoist has been about 120 cars, which indicates that over 2000 tons might be prepared over this breaker. The best record for coal yield is 2.2 tons of prepared coal per mine car.

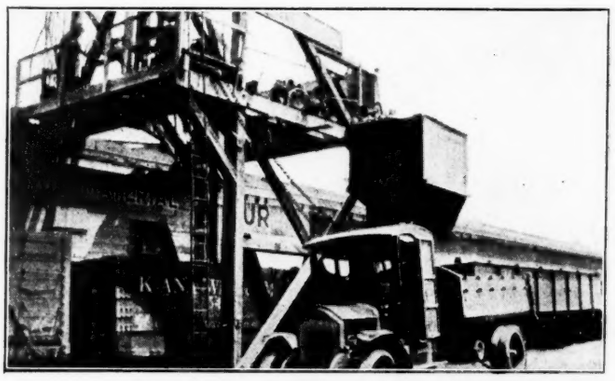
A paper on the preparation of anthracite coal by Paul Sterling was published in Vol. 42 of the *Proceedings* of the American Institute of Mining Engineers. This paper gives anthracite practice of 1912 with special reference to the Mineral Spring plant—all wet breakers are a modification of the methods treated in this article. Much of further interest was noted in connection with Lehigh Valley practice both in the mining and preparation of coal, but space forbids more than general comment. It is quite noteworthy that as preparation requirements become more and more exacting and as poorer and dirtier seams are mined, that less labor is employed in and about breakers. Mechanical devices are supplanting the human element. However, it cannot yet be said of coal preparation as in the manufacture of food—"it is not touched by the hand of man."

For much of the information in this article and for many of the illustrations accompanying it, *Coal Age* is greatly indebted to the various departments of the Lehigh Valley Coal Co., at Wilkes-Barre, Penn. The unfailing courtesy of busy officials should receive grateful acknowledgment. In this same connection, the Guerber Engineering Co., of Bethlehem, Penn., should have special mention.

If a man spends his time in pleasure or in just getting by, he mustn't expect more than he purchases. If he uses the same time to make himself more efficient and to win friends and gain knowledge, he again will get what he pays for. Remember, however, that time can only be spent once. You pay your time and you take your choice.

An Expeditious Car Unloader

A continuously operating car-unloading apparatus, for handling sized coal, sand, crushed rock, etc., has been invented by James B. Seaverns, a Chicago engineer. An endless belt carrying scoops is mounted on a vertical frame the lower end of which rests in the material in the car. By this means the material is scooped up and elevated to a hopper well above the car, whence it is delivered to a horizontal conveyor belt. The latter



THE UNLOADER IS READY FOR OPERATION

dumps the material into a wagon or truck, for delivery. The endless bucket elevator, provided with a concrete weight at its lower end, is supported in a traveling bridge, or crane. The elevator may thus be traversed from side to side of the car, allowing the buckets to pick up practically all the material.

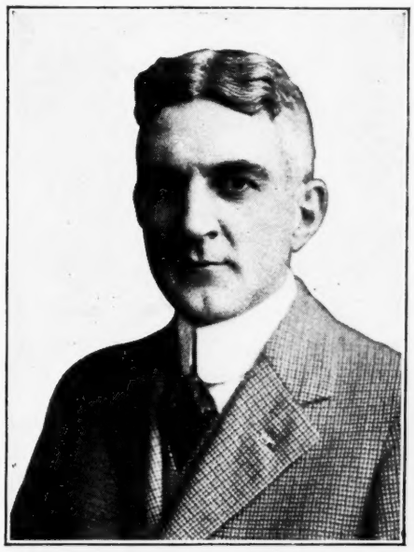
A mechanical feed device advances the machine against the material in the car as fast as it is scooped up by the elevating apparatus. The machine may be provided with a two-way spout and valve in the delivery hopper, to allow the material to be spouted either to trucks on one side of the track or to a storage pile on the opposite side. The machine materially reduces the present loading time and thus tends to relieve the difficulty the railroads are experiencing in getting cars unloaded promptly so that they may be put back in service again. The machine can be operated by either electric motor or gasoline engine.

From Telegrapher to Large Mine Owner

Biographical Sketch of P. A. Coen, President of the Buckeye Coal and Railway Company

HARD WORK, coupled with the desire to succeed and make a mark for himself in the world, have been the two cardinal principles underlying the success of P. A. Coen. He is president of the Buckeye Coal and Railway Co., which controls a large area of coal in the Hocking Valley district of Ohio. Mr. Coen also conducts an important jobbing business. He is a man who has made a wonderful success in all branches of the coal business by perseverance and the capacity to master all details. Mr. Coen is now 40 years of age and has been more or less intimately connected with the coal business for approximately 17 years.

Mr. Coen is a product of the farm, having first seen the light of day on a farm near Cambridge, Ohio. Part of his early schooling was obtained at the local railroad station, where the young boys of the neighborhood congregated, many of them learning telegraphy at their leisure moments. In fact it is said that a number of men, now prominent in the coal industry, started their business life by learning to telegraph at the little railroad office.



P. A. COEN
Hard work, coupled with a desire to succeed, helped him to get on top

After mastering telegraphy Mr. Coen was offered the position of station agent, which included the duties of telegraph operator, freight and express agent, at a station on the Wheeling & Lake Erie R.R. at Beach City, Ohio. This is the junction point of the Baltimore & Ohio and the Wheeling & Lake Erie. When Mr. Coen took this position it was found that the competing railroad had all the best of the grain and live stock shipments out of that section. When the general superintendent assigned him to the position, he said, "I want you to get all of that freight business back."

Investigation showed that the reason for the success of the competing road was the better service given, especially to live stock shippers. Mr. Coen sent word to the shippers that the pens and yards would be improved and that water would be brought to the pens in order to give the animals drinking water and to cool them off in hot days. As a result business came back rapidly.

His work at Beach City attracted the attention of railroad officials and his next step was to go to a railroad and coal property in Pennsylvania, where he worked hard to master the details of the business. In 1904 he was in charge of a coal exhibit at the St. Louis Exposition. While there he familiarized himself with all phases of the coal business, but more especially the gas coal industry, by arising at 5 a. m. and spending his time going through the other coal exhibits and the testing plant operated at that point.

After the exposition he drifted back into the coal business as a salesman. He took several positions and finally landed in Oklahoma as the general manager of an operating company. When he took charge of the property, at the age of 30 years, he found that recent discoveries of oil in that territory caused practically all railroads and many manufacturing plants to use fuel oil as a substitute for coal. The market was a decreasing quantity and he undertook to see what could be done to revive it. In that work he traveled through northern Mexico and all of the southwestern states as far as the Rocky Mountains.

He studied freight rates and mastered all of the details of the business in an astonishingly short time. A law had been enacted recently making five traffic zones. The mines over which he was general manager were thus handicapped by a freight differential of 40c. He secured an attorney to appear before the Oklahoma railroad commission to have the law changed or the rulings suspended. The day of the hearing arrived and the attorney failed to appear because he missed his connections. Since Mr. Coen had spent a month in going over the case with the attorney he was familiar with all of the details and he submitted the case himself, and won his contentions as well as the admiration of the railroad commission and other operators in the state.

Mr. Coen held that position for a year and then came East to sell coal for various concerns. He finally made a connection with the Rail and River Coal Co. and had his headquarters in Toledo. In that capacity he did considerable jobbing of coal and attracted the attention of J. S. Jones, of the Jones & Adams Coal Co., of Chicago. To learn jobbing he took a former jobber into his office, learning that branch of the business through him. How well he succeeded is shown by the results obtained, as the Toledo office of the Rail and River Coal Co. is known throughout the middle west.

Mr. Coen always kept in close touch with market conditions and when there was an advance coming on through a cold spell or railroad congestion he bought heavily of coal, making a good profit. When J. S. Jones purchased the control of the old Sunday Creek Coal Co.—which was shortly after the Grand Trunk R.R. took over the mines of the Rail and River Coal Co.—Mr. Coen came to Columbus as general sales manager of the Sunday Creek. Litigation ensued and the Buckeye Coal and Railway Co. was revived. Mr. Coen was given the presidency. In that capacity he not only mastered the selling but also the operating end of the business.

Successful Shoveling Machine

SYNOPSIS — *Machinery is constantly supplanting hand labor in all phases of coal mining. Shoveling has been one of the latest operations to be successfully performed by machine. Coal mines have been somewhat slow in taking up this method of car loading, but are now adopting it more rapidly than in the past.*

MODERN mines are making increasing use of mechanical devices to secure the output demanded and to maintain reasonable cost of production in the face of constantly advancing expense for labor and material. All departments of coal mining now generally employ machinery. The electric or gasoline locomotive has supplanted the "hay burner." The undercutting machine now does the most arduous work of the miner. Boring machines are now being used to supplement the cutting machines.

Practically the only field of mining which is not well supplied with mechanical means to supplement manpower is the actual loading of the coal into the mine cars. The thinking men of the industry have long recognized the need for machinery to do this shoveling, and the principal reason why this machinery is not as prevalent as, say, the cutting machine, lies in the lack, at least until recently, of such a machine.

For over ten years designers, engineers and inventors have been paying considerable attention to this problem, and at the present time the only excuse that up-to-date mines have for not employing loading machinery is the fact that they may not be able to secure as prompt delivery of such appliances as they might desire.

The machine built by the Myers-Whaley Co. was first developed some ten years ago, and has long since passed the experimental stages through which all new machinery must go. For some years past machines of this manufacture have been in constant successful use under the most severe physical conditions. The first machines were built for loading coal, and the first one, which is shown in Fig. 1, loaded several thousand tons of coal in several experimental trials.

Some Improvement Was Needed

This machine was the basis upon which the later ones were designed. Being a radically new invention, it is natural that it should have incorporated in its make-up some features which would need improvement. As a whole, however, the original machine was highly successful and clearly pointed the way along which improvement should proceed.

Later on it was found that the rock and ore mining people had an even more pressing need for this machine than the coal mines, and were in a more receptive mood, willing to pay for machines and eager to obtain them. Following the line of least resistance activities were soon exclusively occupied in developing and furnishing machines for loading rock and ore, and have been so occupied for approximately the past five years.

As an illustration of how well the builders have succeeded in this particular field, one of the machines which was built six years ago and which was used for a number of years for loading rock is now in use by the Darby Coal Mining Co., at St. Charles, Va., in driving entries, and is giving successful and satisfactory service. In this work at St. Charles the entries are driven about 6 ft. high, and as the bed of coal is only 36 in. thick, it is necessary to lift a considerable amount of bottom. It was found difficult to keep men steadily at work taking up this bottom and the manager of the mine, C. H. Thompson, decided to use the shoveling machine for this purpose. He states that it has solved his problem and that he drives all entry work required with this one shoveling machine.

Another one of the older machines has been in continuous service for the past five years, loading rock salt, underground. The company has since ordered six additional machines, which indicates with what success this machine has done its work. The average loading under these conditions is from 200 to 250 tons per 9-hour shift.

Many Installations Have Been Made

A number of other interesting installations might be mentioned, but it is feared that this would take up more space than is available. It might be stated, however, that coal mines are now recognizing the usefulness of this device and that machines are now being supplied for loading coal. Such machines have recently been furnished to two of the largest concerns in Utah.

By the use of shoveling machines a considerable reduction in cost of loading is possible, even with the general advance in other costs. In addition to this the machine does the work of 15 or 20 men, and at operations not having plenty of help the men thus displaced can be put on other work. If men are not available the output can be secured without putting them on the payroll.

To those not familiar with this machine, a brief description of its operation may be of interest. Referring to the photograph, it will be seen that the machine consists of an automatic shovel mounted upon the forward end of a jib upon which jib is carried a reinforced belt conveyor which receives the coal from the shovel and transfers it to a second conveyor mounted upon a supplemental rear frame which is pivoted at the center of the machine and extends over the mine car.

The main frame which carries both the jib and the rear conveyor also supports the motor and propelling mechanism. The jib can be swung by power 45 deg. to either side, so that the shovel can reach a distance of 10 ft. to each side or clean up a space 20 ft. wide from one track. The rear conveyor can also be swung laterally so as to load either upon the machine track or upon one paralleling it.

The entire machine is moved forward and backward under the control of its operator, who is stationed upon a platform on the jib frame. From here he can clearly see the shovel and direct it. The controller for starting and stopping the motor is also mounted upon this platform directly in front of the operator. He can

THE ORIGINAL SHOVELING MACHINE AT WORK IN A COAL MINE

therefore start and stop his machine, swing the shovel laterally, and move the machine forward and backward without leaving his seat.

The shovel is entirely automatic in its action and is a unique piece of mechanism consisting of a shovel member, 34 in. wide, having an auxiliary or rear section fitted into it. The shovel is actuated and supported by a crank which rotates continuously, and which is driven by heavy roller chains on each side of the machine. The rear end of the shovel is carried by a cross shaft having rollers on its ends which run in cam grooves. This gives the mouth of the shovel a motion quite similar to that of a shovel actuated by hand.

The front part of the shovel discharges into the rear section, which has auxiliary cam rollers engaging another cam groove and which turn the rear section partly over during each stroke. In this way the material is picked up and transferred to the belt conveyor at the rate of one shovelful for each rotation of the crank. This crank rotates at a speed of 12 to 13 r.p.m.

In making use of the shoveling machine, it is necessary to attend to some details more carefully and in slightly different manner than is done for hand loading. These embrace the following particulars:

1. The machine should have good solid tracks upon which to work, as no jacks or fastenings of any kind may be employed. The machine relies upon its weight and friction on the track to maintain its stability and to give the necessary force to shovel.

2. The coal should be shot down in such a way as to enable the shoveling machine to clean up the room without waiting for men to pick down standing coal. This is quite important as the machine will clean up a 40-ton room in about 1½ hours if it is not delayed by having to wait for coal to be broken down.

3. It is essential to arrange side tracks and trips with an ample supply of cars, so that a minimum of time will be consumed in moving out the loads and placing empties back of the machine. Under ordinarily good conditions this can be done readily in less than one minute per car. It should be realized that any more time spent in shifting cars is wasted and will reduce the output from the machine.

4. The machine is equipped with a 20-hp. motor and the power lines and supply should be amply large to furnish current power to this motor.

5. The machine is easily operated. An intelligent man can readily learn to run it in a few hours. The mechanism, however, should be inspected regularly, and although the machine is capable of operation by medium grade men, a competent mechanic should have charge of it and see that it is properly oiled and handled and that irregularities are promptly attended to. This, of course, is true of all mechanical devices and is not peculiar to the shoveling machine.

How Oil Saving May Be Achieved

These methods of saving lubricating oils are posted in the machine shops of Germany:

Use only closed oil cans, with spouts tha will deliver drops, or at most only a thin stream.

Use all lubricating apparatus strictly according to instructions and put the oil only where it will actually lubricate. If a machine has automatic droppers, shut off the supply while machine is standing.

Do not use cylinder oil on shafting or elsewhere when cheaper oil will answer.

Keep all rubbing surfaces in good condition. Rough surfaces and too tight boxes consume more oil. Worn and leaky bearings waste oil.

Always use drip pans, and arrange to filter and cleanse the oil so caught. It is as good as new.

Collect all greasy waste and wiping cloths, so that the oil may be recovered. Never burn them.

Be careful about using lubricating oil for cooling a bearing. Water will often do as well.

Be careful about using oil for cleaning and polishing. Never clean the hands with oil. A greasy cloth will do as well.

Electric Hoist at Alaska Colliery

DURING 1917 the Philadelphia & Reading Coal and Iron Co. installed at its Alaska Colliery, No. 10 Plane, located at Mt. Carmel, Penn., a two-speed electric hoist, manufactured by the S. Flory Manufacturing Co., of Bangor, Penn. This hoist was designed to operate on a power plane in the Mammoth Vein. The illustration at the head of this article shows the hoist building and mouth of the plane. The cars, however, are not hoisted to the surface. Figs. 1 and 2 show the hoist in operation. Fig. 3 shows a general plan of the plane and lifts.

This two-speed hoist was designed so that the power factor would be practically the same for hoisting the loaded cars from the lifts and pulling the empties up the plane. This means efficient hoisting.

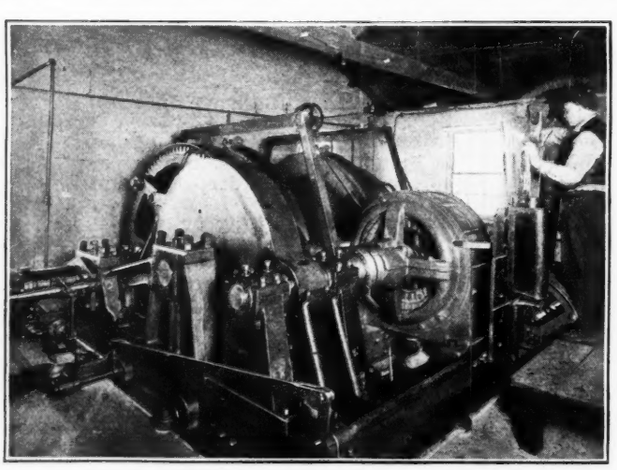
The length of the plane (five levels) is 1400 ft., while the pitch of the plane is 26 deg. The load on the hoist is as follows: Cars per trip, 2; weight of loaded trip, 20,000 lb.; weight of empty trip, 7000 lb.; size of rope, 1⅛ in. (The weight of rope is not included in the foregoing figures.) The rope speed in hoisting the empty trip is 500 ft. per minute, while in hoisting the loaded trip it is 250 ft. per minute.

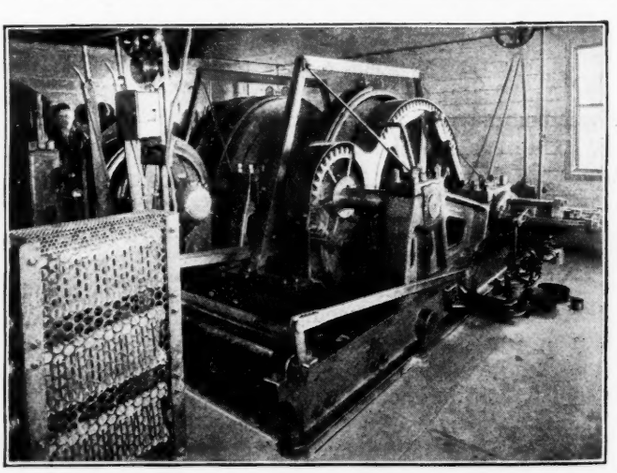
The cycle of operation is as follows: Accelerate empty cars at bottom, 5 sec.; hoisting empty cars on slope, 131 sec.; stop-accelerate to lower in lift, 5 sec.; lower empty trip in lift, 18 sec.; decelerate empty trip, 5 sec.; changing ropes, 30 sec.; accelerate loaded trip, 10 sec.; hoist loaded trip out of lift, 18 sec.; stop-accelerate loaded trip, 10 sec.; lowering loaded trip on slope, 163.7 sec.; decelerate loaded trip, 15 sec.; changing ropes, 30 sec.; making a total for an average trip of 440.7 seconds.

In order to perform the cycle given and the duty imposed, the hoist was designed with all cut-steel gearing, the gear ratios giving 500-ft. and 250-ft. rope speeds. The primary gear reduction, or that between the motor and countershaft, is accomplished through cut herringbone gears; the secondary reduction, or that between counter- and drumshafts, is through spur gears. The drum is cast iron, 60 in. in diameter and 36 in. long between the flanges. Each gear is provided with a Werner patented band friction, well known in the coal industry. The frictions are operated by patented air-thrust cylinders, giving the operator sensitive control. The drum has two brakes, each 8 in. wide, equipped with "vita-bestos" brake lagging. The machine is sectionalized throughout so that it can be taken into the mine in the future if desired. The hoist is driven by a 100-hp. continuous-duty rated motor with master control. This type of hoist is in use by a number of mine operators and in other lines of industry with universal satisfaction. Another hoist is under construction by the same manufacturer for the Philadephia & Reading Coal and Iron Co. for similar operation.

We are indebted to J. T. Jennings, electrical engineer of the Philadelphia & Reading Coal and Iron Co., for the data and drawing of the plane.

The machine here described and illustrated has been





FIGS 1 AND 2. INTERIOR OF HOIST HOUSE SHOWING BOTH SIDES OF THE HOIST ENGINE

in operation for some time and is giving excellent satisfaction. The impression created by the operation of this machine was well expressed by the man who runs it,

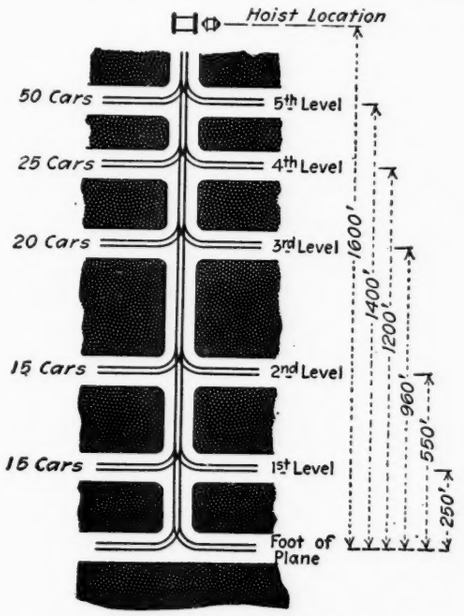


FIG. 3. GENERAL PLAN OF SLOPE

when he said in reply to the question of what he thought of its operation, "I think she works like a top!"

Many a man is wondering what hinders his success in life when it is all as easy as falling off a log. He is governing himself according to guesswork. Don't guess; know facts. Facts count and guesswork is no account!

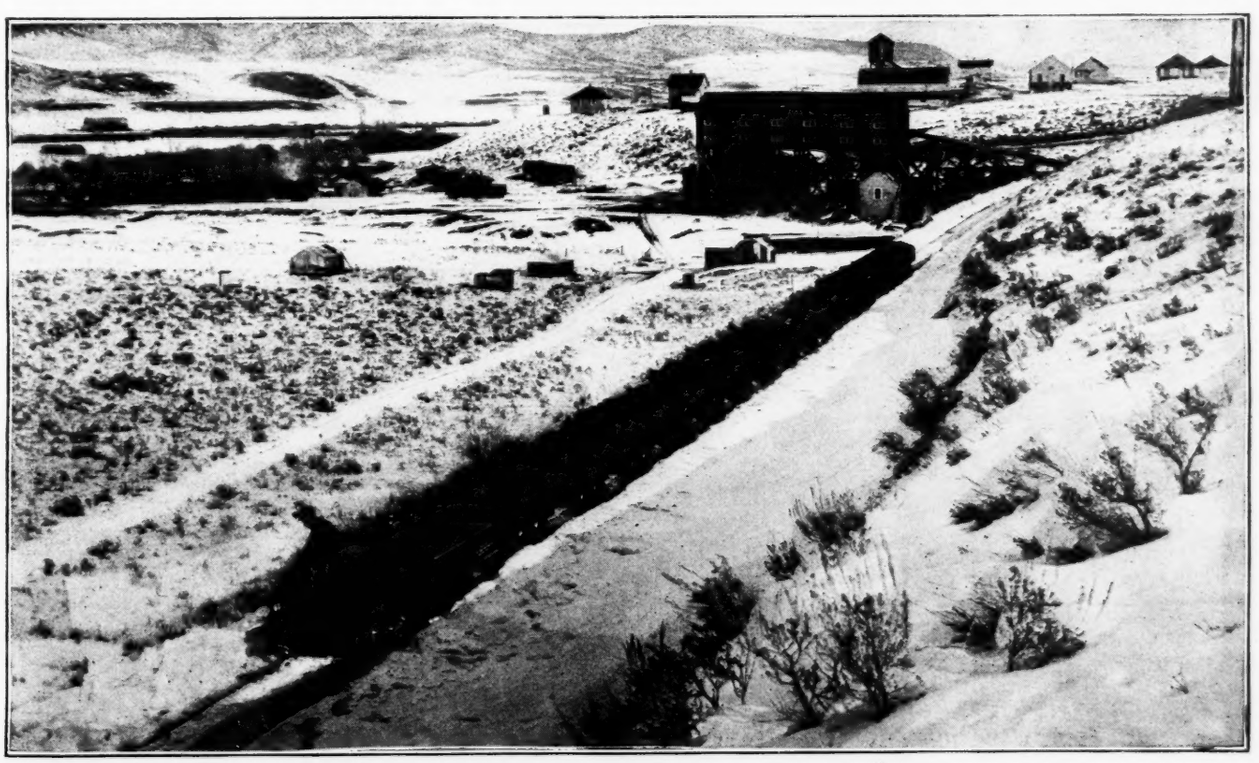
Every man who works uses his employment as either a meal ticket or an opportunity. If he looks upon it as a meal ticket to tide him over from day to day, he must never expect to travel very far or climb very high. If he looks upon it as an opportunity to open the door to something bigger and better, through expert service and the complete mastering of his task, there is no limit to the distance he may go.

Storage-Battery Locomotives Enter Colorado Coal Mines

The McNeil Coal Co. is, apparently, the first to introduce the storage-battery locomotive into coal mines in the State of Colorado. The illustration shown below is of an Ironton locomotive of this type in operation between the company's newly opened mine No. 2 and the tipple, at its property at MacGregor, Routt County. In opening this mine the company considered the various available methods of transportation over a line approximately 4000 ft. in length and having a grade averaging 1½ per cent. in favor of the load. Its decision, therefore, to apply the storage-battery locomotive is of unusual interest, although it is in line with well-established practice in the Eastern coal fields.

The locomotive is a 5½-ton low type, equipped with 48 cells of battery and a single heavy duty motor. It has single end-drum control, and in tests has demonstrated a satisfactory drawbar pull. The results thus far have been both encouraging and gratifying.

The Grand Junction Mining and Fuel Co., whose ownership is vested largely in the McNeil Co., has placed a 4½-ton Ironton in its mine at Cameo, Colo., for gathering purposes. Other Colorado operating companies have placed orders for similar storage-battery equipment.

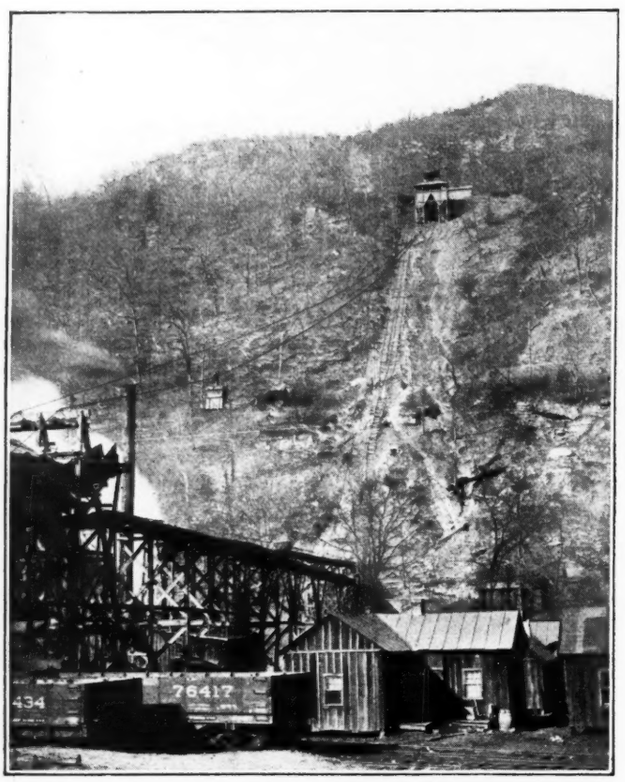


IRONTON STORAGE-BATTERY LOCOMOTIVE IN OPERATION AT A COLORADO MINE

Aerial Tramway at a Coal Mine

The accompanying photographs show a Broderick & Bascom Co. aërial tramway recently installed by the Rex Coal Co. at Kitts, Ky. This tramway is approximately 850 ft. in length with a fall of about 300 ft. in this distance. A capacity of 60 to 75 tons of coal per hour can be handled by this equipment from the loading station to the tipple at the railroad tracks.

The buckets, of 3000-lb. capacity, are of the automatic bottom-dump type. The trolley sheaves are fitted with



LOADING STATION AND TRAMWAY

Hyatt roller bearings. Only one attendant is required for the operation of this tramway. This man is located at the loading station and controls the filling of buckets as well as the brakes regulating the speed of the line. At the discharge station the buckets are dumped automatically.

The control sheave is of the three-groove type, 6 ft. in diameter, and equipped with two 4-ft. diameter brake rings. The brake bands are lined with asbestos. The track cables are $1\frac{3}{4}$ and the traction rope $\frac{9}{16}$ in. in diameter. The coal is brought out of the mine on mine cars, which are dumped into a 50-ton bin at the loading station of the tramway. The top of this bin is on a level with the mine tracks. The coal is then drawn into the tramway buckets through steel chutes, the flow being controlled by the operator by undercut gates.

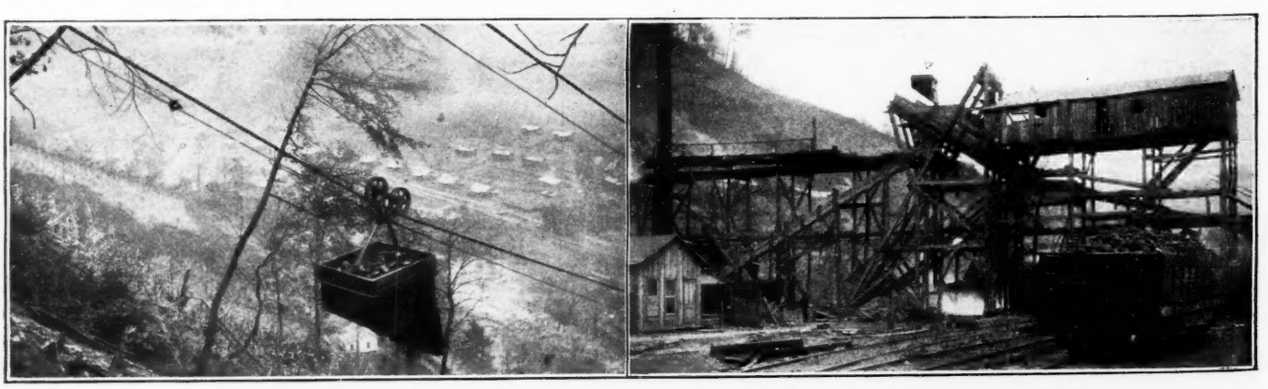
The Rex Coal Co. reports that this tramway is in satisfactory operation, and from all indications it is capable of handling from 25 to 50 per cent. above the rating guaranteed by the builders.

How the Lehigh Coal and Navigation Co. Boosts the Liberty Loan

By W. G. Whildin
General Superintendent, Lansford, Penn.

The basis of our scheme for securing subscription for a Liberty Loan Bond is personal solicitation. We have a general committee, consisting of the heads of all departments, and officers and executive committee members of the mine worker's organizations, with the writer as chairman. Each of these heads of departments then acts as chairman of his district committee, which consists of all inside and outside foremen. At each mine the soliciting committee consists of the foremen, assistant foremen, loader bosses, night patrolmen, grievance committee men, safety committee men, and first aid and rescue men. Each of these members takes his own small district and personally talks over the question with his men. If a workman refuses to buy a bond, or gives some reason for not doing so which is not believed, his case is at once reported to other members of the committee, who take steps to bring the man into line—and they always succeed. It requires a strong valid excuse for exemption.

For the third Loan, we will follow out our policy of the two former loans, of having payments made in twenty installments deducted from each semi-monthly pay. The committee at each mine is being furnished with a complete list of subscribers, the amount of bonds subscribed for under the first loan, and also the amount subscribed under the second loan, and in addition information as to whether the subscriptions were completed before the final installment date, or whether cancellation of either or both subscriptions was made. In this manner each committee will have the facts before it, and it will be difficult for anyone to shirk.



VIEW OF THE 3000-IB. CAPACITY BUCKETS IN OPERATION AND THE MINE TIPPLE

Southwest Believes Its Fuel Difficulties Are Solved

Harry N. Taylor, one of the live wires of the Southwest and general manager of the Central Coal and Coke Co., writes us as follows:

In the Southwest the past winter's coal production and distribution went forward without the harrowing conditions experienced in the Eastern States. At no time during the entire winter was there any actual

HARRY N. TAYLOR

suffering and on no occasion was a general closing of industries necessary in any of the Southwestern or far Western states.

There were two reasons for this: (1) Because there are no congested manufacturing centers in that territory to make extraordinary demands on the railroads. For this reason the gateways to our manufacturing communities never became cluttered with an accumulation of materials gathered for the manufacture of war munitions. (2) Because as early as last May, through the Peabody committee, the closest working relations were established between the railroads and the operating interests and these relations were maintained even after the passing of the Peabody committee. As there was thus secured a close coöperation between the producing and the transporting interests the situation was greatly relieved.

There was, of course, a shortage of coal, and the movement at times was slow; but there was no more severe stress than has often occurred in past years during extraordinarily cold weather, such as we experienced the past winter. There were no heatless days, and early closing orders were more calls to do our bit than an actual necessity.

The zoning system as it is now established by the Fuel Administration will benefit both the operator and consumer in the Southwestern States. It will prevent coal from coming into that territory from far distant sources of supply, and render cars available for short hauls between the coal fields and the nearby consuming centers. This will greatly facilitate the movement of coal for the car supply will thus be made more adequate. As almost the entire shortage last year was due to lack of transportation, this will be largely eliminated by the zone system.

The labor situation in Iowa, Missouri, Arkansas, Oklahoma, Wyoming and Texas is entirely satisfactory. There is little or no friction between the operators and the men. In Kansas, there has been much idle time, caused by the unfortunate leadership of the miners in that district. It is hoped that the new penalty clause imposed by Dr. Garfield will eliminate local strikes in Kansas, and make available a large tonnage which has been lost during the year through labor troubles.

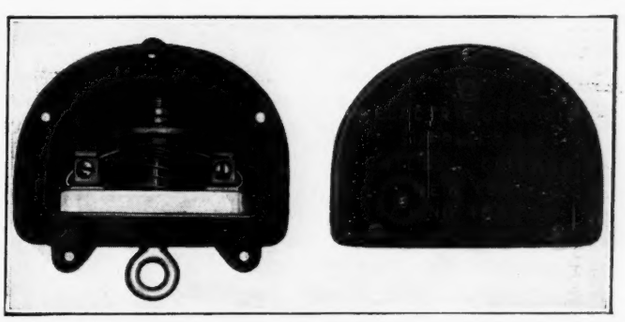
On the whole, the outlook for the Southwest and far West is brighter than it was at any time during the past year. There are three governing factors: the operators, the railroads, and the consumers. The first two are already thoroughly lined up. If the consumers will do their share by buying for early storage, so as to keep the mines in continuous operation, the problem of preventing a recurrence of last winter's shortage will be successfully solved.

Mine Signal Pull Switches

The Electric Service Supplies Co., of Philadelphia, Penn., has recently placed on the market improved types of mine signal pull switches for high- and low-voltage circuits. These are intended particularly for use on mine-signal systems operated by storage-battery or high-voltage circuits. They are designed for easy and quick operation, being fitted with plungers to which may be attached a cord, wire or chain to bring them into easy reach. They close the circuit only as long as the plunger is pulled down and held, and open the circuit on release.

Both types are inclosed in weather-proof iron boxes with covers fitted with rubber gaskets. The switch proper is mounted on a porcelain insulating base.

The battery-circuit type, illustrated, includes a circuit-closing mechanism which is simple and rugged



BATTERY-CIRCUIT TYPE PULL SWITCH

in construction and which produces a double break and rubbing contact. The circular contact disk is free to revolve, thus continually offering a new contact surface. These switches are 5 in. wide, 4 in. high and 3 in. deep over all. They weigh 4½ lb. each.

The high-voltage type is similar to the battery-circuit type except that the former is larger and fitted with a quick-break mechanism to take care of the higher voltage. The circuit-closing mechanism is insulated from the iron box and produces a quick-acting double break and rubbing contact. This type measures 6¼ in. in height, 5 in. in width and 3¼ in. in depth over all. The switches weigh 8 lb. each.

Annual Convention of Michigan-Ohio-Indiana Coal Association

THE most important feature of the annual convention of the Michigan-Ohio-Indiana Coal Association, held at the Hotel Sinton, Cincinnati, Ohio, on Apr. 9 and 10, was an address by J. D. A. Morrow, General Director of Distribution of the United States Fuel Administration.

Speaking before over 400 members, Mr. Morrow, introduced by R. A. Colter, president of the Cincinnati Coal Exchange, explained frankly the purposes of the Fuel Administration, stating that the distribution of coal under present conditions is essentially a matter of organization. He pointed to the vast industrial organization of Germany, perfected for 50 years for war purposes, in proof of this, and declared that this country must perfect as good an industrial organization behind its armies in order to win the war. Coal organization in Germany before the war was in the hands of three great syndicates, he said, and when war began the government forced all operators into these syndicates in order to have all distribution centralized in its own grasp.

What Fuel Administration Hopes to Do

Contrasting this compact government-controlled organization with the disorganized state of coal and other industry in the United States, Mr. Morrow declared that the Fuel Administration now aims to bring about organization in the coal trade with the aid of trade, and pointed out that in a real sense this country is at war not only with the German government but with the close-knit organization of the entire German industry as well. As to details, it is doubtful, he said, if the railroads of the United States, burdened with war freight, will be able to transport all the coal that the industries may ask for during the coming year. "It therefore becomes the duty of all of us," he said, "to see to it that coal goes first to those absolutely necessary uses on which the prosecution of the war primarily depends. That means in plain English that some of the less important consumers will be asked to go short, if anybody is to go short. The entire Fuel Administration must see that important consumers get their coal supplies."

Talking of essential and other industries, he referred to a conference with the War Board at which a list of important consumers was completed and stated that those consumers will get coal. Generally speaking, a decision has to be made between essential and non-essential industries by the War Board, in case of a shortage, referring to a case where a railroad recently confiscated coal consigned to a ship plate plant, thereby delaying ship construction. Domestic consumers were placed on the preferred list, he stated, subject to the arrangements of the zone system, and public utilities were similarly placed; but as to the latter, he emphasized the fact that storage facilities must be provided so that coal can be stored this summer, otherwise such utilities will be heard to complain next winter that they can get no coal. Also, should construction of such facilities involve heavy cost, he suggested that such cost should be considered by rating commissions as ground for increased rates, if necessary.

Mr. Morrow expressed appreciation of the work of the coal trade as a whole, especially in enabling the Fuel Administration to operate through trade associations to get to individual members in a mass. He gave an instance of a dealer who misrepresented facts to get coal and sold it to local industries, thereby depriving essential industries of fuel, and declared, "You are going to help me put that kind of dealer out of business until the war is over." The present policy of the Fuel Administration is to utilize the experience and ability of the coal men in handling problems confronting it, both by permitting business to remain in its usual channels and by direct aid of coal men in Washington.

The zone system, the speaker explained, was devised to meet the fact that the bulk of essential war industries is located on the Atlantic Coast, and that West Virginia and Pennsylvania coal must all go there, thus leaving Ohio, Michigan and the Middle West to be served by other fields. Similarly, Oklahoma, Arkansas, Kansas, Missouri, Wyoming and Colorado must use coal from their own or near-by fields and, moreover, must store it, if possible, during the summer, in order to enable those fields to operate to capacity, instead of on part time, as at present. This shifting of coal transportation threw new demands on the railroads in the sections indicated, and it was only after full consultation with them that the Fuel Administration announced its zone system, which in some respects must still remain tentative, awaiting developments, and subject to change accordingly.

Believes Production Will Fall Off

"It is not only possible, but quite probable, that the production of coal will fall off," declared the speaker, pointing to the increasing demands of the army and manufacturers, "and it is up to the domestic consumer to get his coal while he can." Mr. Morrow closed by emphasizing the seriousness of the situation, pointing to a partial failure of the United States to keep the industrial program to the mark in aiding the Allies, and asking the full coöperation of the coal trade in enabling the Fuel Administration to handle its vital problems, expressing complete confidence in obtaining it.

Noah Swayne, Commissioner of the National Coal Jobbers Association, now an assistant in the Fuel Administration, addressed the meeting of the jobbers in the morning on trade conditions and work at Washington, and spoke before the convention following a brief report by Secretary Nigh. Mr. Swayne declared that the legitimacy of the jobber's functions has been recognized, and that new regulations of the Fuel Administration are satisfactory to that branch of the trade. He said that Dr. Garfield is a big man, and that it was as well that a coal man was not made Fuel Admin-

istrator, as the appointment of a layman had disarmed suspicion and secured public confidence.

The speaker pointed out that Garfield's appointment occurred on Aug. 20, and that the coal year was far advanced then, so that the developments of the past winter could hardly be charged to the Fuel Administration. "Dr. Garfield has two sons in uniform in France," he said, "and a man cannot give his sons to a cause and then fail to give his best efforts to his own work in that cause."

In reply to a question, Mr. Morrow stated that the distribution of anthracite would be announced May 1 on the basis of 1916 and 1917, and that it would be limited only by the prior needs of near-by Eastern consumers. On another inquiry as to confiscation by municipal authorities, he said emphatically that such confiscation tends to disarrange distribution plans and stops one gap to make another more serious. "Such wholesale confiscation as occurred last winter will not be permitted," he said. The convention was entertained Tuesday evening at a theater party.

Wednesday's session was brief, and the convention was concluded before noon with all business transacted. Moving pictures giving the members an idea of the tremendous ice gorges which recently blocked river traffic were shown, following which Samuel B. Crowell, of the National Retail Coal Merchants Association, addressed the convention.

Mr. Crowell said that Dr. Garfield, however inexperienced in the coal trade, is fair and honest, with no intention but to give the public and coal men alike a square deal, which has been apparently accomplished as to coal retailers, he said. That the national organization has been largely responsible for the satisfactory adjustment of the coal situation as between retailers and the Government was the opinion expressed by Mr. Crowell, advantages in having a representative in Washington being emphasized. He expressed hope that a representative of the retailers will shortly be placed on the Fuel Administration to give the Government the advantage of his practical experience, pointing out incidentally that the Administration is now following certain advice embodied in resolutions adopted at the coal meeting in Baltimore some time ago.

The essential need now is for more motive power, Mr. Crowell declared, stating that not more cars but more engines are needed to enable coal to be moved. Much therefore depends on Mr. McAdoo as director of railroads, rather than on the Fuel Administration, he said. The work of the Fuel Administration in investigating the cost of doing business was commended by the speaker, who declared that now is the opportunity of trade to get on a proper merchandising basis. He expressed the belief that the Fuel Administration will probably be a permanent, successful organization.

Nominations were presented and unanimously indorsed. Homer C. Gill was elected president, H. A. Bauknecht, vice president, and W. A. Gipson, treasurer. Resolutions adopted included assurance to the Fuel Administration of full support and coöperation. C. M. Moderwell, of Chicago, prominent in the work of the Peabody-Lane commission, outlined the history of the Government's handling of the coal trade, including the agreement of the operators to reduce their prices and the refusal of the authorities to accept the agreement then made, with the subsequent shortage, resulting from the drop after production had been raised to two million tons daily.

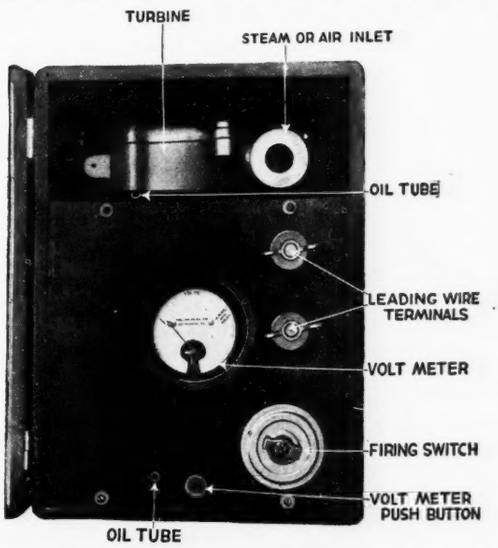
The subsequent price regulation by the Administration, the readjustment of the original basis adopted and the final adoption of substantially the same basis offered voluntarily by the operators, was recounted by Mr. Moderwell. He concluded with a warmly patriotic utterance, urging coal men to do their part as American citizens and declaring that business as usual is impossible, sacrifice being necessary to win the war.

Mason Turbine Blasting Machine

Something new in electric generating devices for firing explosives by electricity is found in the Mason turbine blasting machine. This was designed to fill a long-felt want in large blasting operations where steam or air is available.

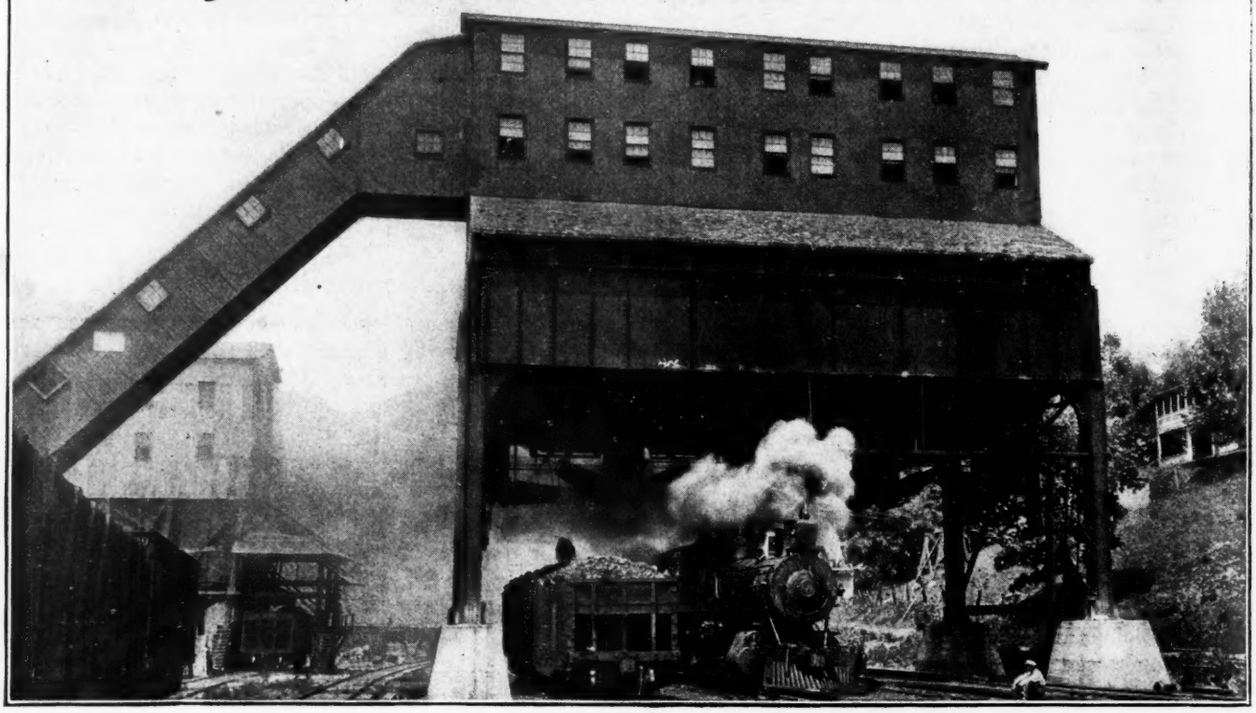
The machine consists of an electric generator direct-connected to a turbine motor, which depends for its motive power on steam or compressed air. When operated at full speed the generator will produce a current of 10 amp. at 300 volts.

The machine is incased in a substantial hardwood case, the control board being located on the top of the case and protected by a hinged cover. The operation is decidedly simple. The wires are attached to the terminals or binding posts and the air or the steam turned on. As the speed of the turbine increases the generator gradually picks up the voltage. The voltmeter push button is held down and when the voltmeter indicator moves to the firing point the firing switch is pressed and the connected charge is detonated. A spiral spring which the voltmeter push button compresses forces the push button back to its original position and thus keeps the circuit open. The machine is lubricated through oil tubes leading to the top of the case. On the lower side of the case is a corrugated-iron pipe outlet (not shown in the illustration) through which the exhaust steam or air passes. The size of the case is 14½ x 13 x 10¾ in. and the machine weighs 42 pounds.



DETAILS OF TURBINE BLASTING MACHINE

Coaling Locomotives on the Norfolk & Western

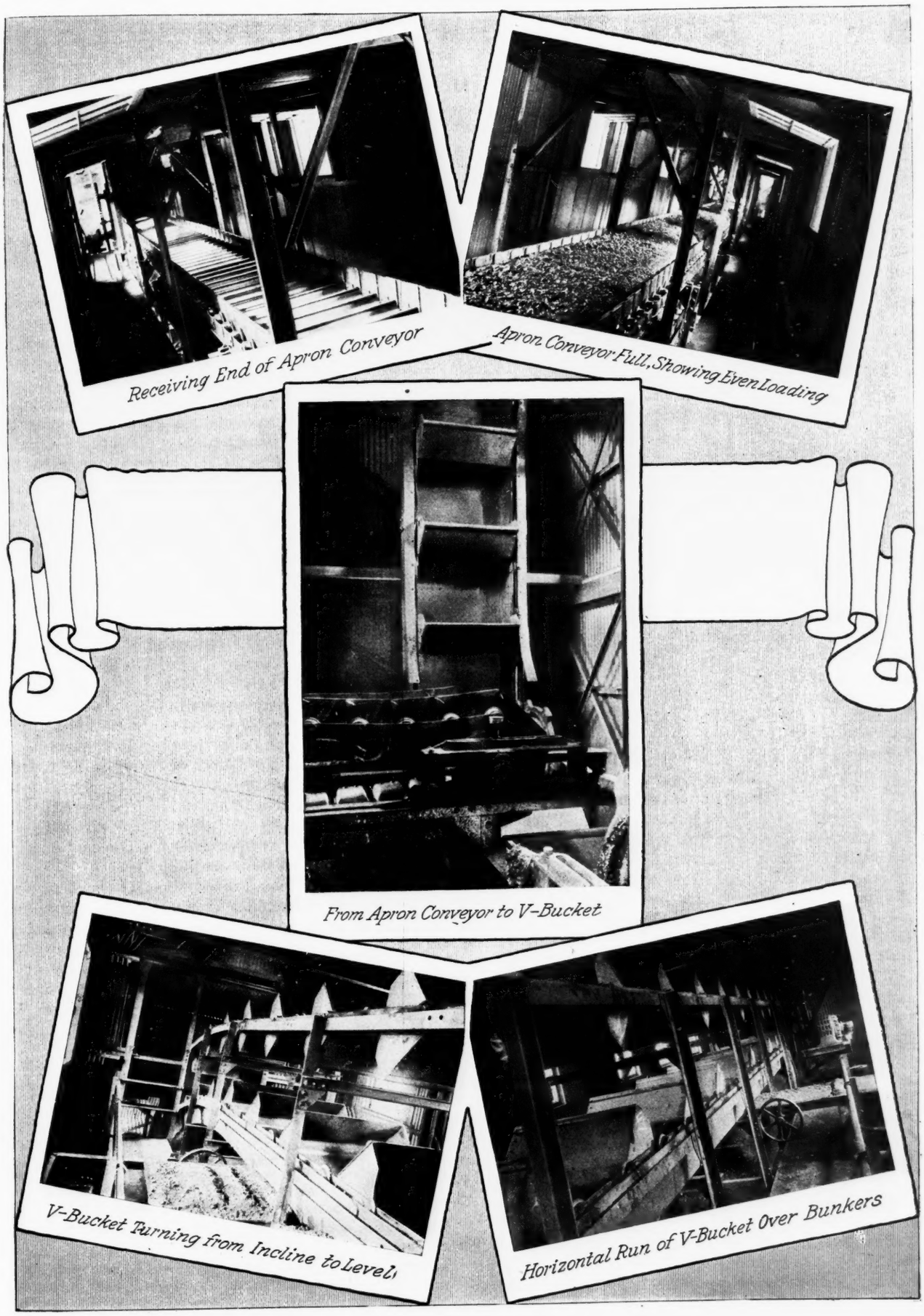


SYNOPSIS—*For quick dispatch in coaling locomotives it is necessary to have the proper kind of coal stored ready to be immediately spouted into the locomotive tender. A coaling station is here described where the fuel passes directly by conveyor from the mine to the station bin. Transportation expense is thus avoided and locomotive fuel is always available.*

PROBABLY no two industries are so closely associated as coal mining and railroading. The mines depend on the railroads to distribute their output, while the railroads have to buy fuel before the distribution can take place. It still takes coal to haul coal, even though oil-burning engines and electric locomotives are increasing in number each year. The relationship between railroad and mine is so close and so important as to form the subject of much legislation, both state and national.

There are some roads whose chief business is that of handling coal. One of these is the Norfolk & Western, which gathers trainload after trainload from the mines in West Virginia and Virginia, carrying the loaded cars eastward to ships at Norfolk, Va., or north and west to Columbus, Ohio, where other roads take them over for delivery to the factories, mills and yards of our Central States. But the locomotives which draw the coal trains need fuel and accordingly each division of the run is provided with facilities for filling the locomotive tender with as little delay as possible. The newest coaling station is at Vulcan, W. Va., and is one which has received the approval of all those who have seen it as being one of the most convenient and efficient stations on the line. It has one marked advantage in that the coal here stored is taken directly from the mine tipple, which can be seen behind the inclined gallery at the left of the view reproduced in the headpiece.

The coaling station spans four tracks and has a storage capacity of 750 tons, although it is seldom called upon to deliver more than 200 tons in any one day. As stated above, the coal comes direct from the stationary screens in the tipple, passing into a bin from which it is drawn by a short double-beaded apron feeder and delivered to a 32-in. apron conveyor which transports it 116 ft., to a V-bucket carrier. The two upper views on the facing page show the apron conveyor empty and full, the right-hand illustration showing the even distribution of coal provided by the feeder. The center view shows the point at which the coal is delivered by the apron to the V-bucket conveyor. The buckets of the latter are 24 x 36 in., made of $\frac{3}{16}$-in. steel and mounted between two strands of 18-in. pitch steel-bushed roller chain. Their path is first vertical for 13 ft., then on an incline for 57 ft. (see headpiece), finally straightening out into a 60 ft. run over the bunkers (shown in the two illustrations at the bottom of the facing page.) There are two discharge gates which allow the coal to drop onto bar screens where it is divided into two sizes which are separately stored as run-of-mine and stoker coal. Each gate serves one screen and each screen supplies two pockets, one for each kind of coal. This division allows locomotives to receive either size of coal, on any track. All the equipment from the tipple to the bunkers, including the housing, was built and installed by the Webster Manufacturing Co., of Tiffin, Ohio.



Receiving End of Apron Conveyor

Apron Conveyor Full, Showing Even Loading

From Apron Conveyor to V-Bucket

V-Bucket Turning from Incline to Level

Horizontal Run of V-Bucket Over Bunkers

Inherent Ability and Success

Brief Biography of Robert E. Hobart, Mechanical Superintendent Lehigh Coal and Navigation Company

WHEN a man receives a good round of applause after a service of many years with one concern—steady promotion from one of the lowest to one of the responsible positions in the active management of a big coal company—then it is not mere curiosity which makes men reflect on the reasons for this reward. It should not be difficult to read between the lines of this brief sketch of a life crowded full of endeavor and achievement—a struggle for place and position.

ROBERT E. HOBART
Started down at the foot of the ladder and climbed high by application and hard work

Robert E. Hobart was born in June, 1874. He comes of one of the old families of eastern Pennsylvania and lived in Tamaqua when a boy. His father was a Lehigh Coal and Navigation Co. man, and it is not surprising that the son should start his business career with the same company.

At fifteen years of age he became an apprentice in the Lehigh Coal and Navigation machine shops, and at the end of four years developed into a full-fledged machinist. He worked a number of years in this capacity and as a handy man at the shops. Rounding out his early training by a course in mechanics and as a draftsman, in a short time Mr. Hobart was made assistant general foreman at the Lansford shops. Later he became assistant mechanical superintendent, rising to master mechanic, and now holds the position of mechanical superintendent. He has jurisdiction over all the mechanical operations of the mining department of the Lehigh Coal and Navigation Co., including the Cranberry Creek Coal Co. and the Harwood Coal Co. The latter affiliated collieries are near Hazleton, Penn. All mechanical matters, steam, electrical and compressed air, and the extensive Lansford shops receive his attention.

It is most noteworthy that Mr. Hobart has come so rapidly to the front in the electrical end—in the development of electrical machinery as applied to mining. Further, that through it all his ideas in new applications of electrical machinery have proved in every case to be entirely practical and extremely successful. While he does not hold an engineering degree from a university, he intuitively grasps technical matters and goes through with them. The Lehigh Coal and Navigation Co. is one of the leaders in the electrical development in the anthracite field, which is largely due to the efforts and foresight of its organization, of which Mr. Hobart is an important part.

Big developments in the way of improved hoisting machinery, car-handling devices at shafts—also mine-car and headframe construction—in all these matters he has taken a prominent part. In the pump end he has labored to eliminate old, wasteful steam pumps of antiquated type, substituting modern, electrical centrifugal machines. All these efforts have tended to result in greater efficiency in the production of coal, decrease in costs—especially in the item of maintenance. Mr. Hobart is amply justified in priding himself particularly that serious breakdowns in machinery on the operating end are almost an unknown quantity.

His practical knowledge of the mechanical end of the coal-mining proposition is such that he can always find his way out of difficulties. He knows where a thing is, what it is for and how it can be applied. He thoroughly believes in "yardmaster talk" and yardmaster action—going out on the work and getting things done. Mr. Hobart has an unusually strong personality and the saving grace of a sense of humor. This is attested by his popularity with his men and in the town in which he lives.

He is sometimes addressed as Captain Hobart, for he had a long connection with the National Guard of Pennsylvania. His military experience dated from 1896 until 1911, when he retired with the title of captain. At present he is treasurer of the armory board at Tamaqua. His contributions to engineering societies and technical periodicals in the way of papers and articles are valuable additions to mining and mechanical literature.

Mr. Hobart's extreme reticence to talk about matters connected with himself leaves many blanks—including his home life and many interesting personal reminiscences. His modesty is strikingly exemplified in the type of picture which we are obliged to publish of him—it is taken from a group—the only one obtainable and that without his knowledge or consent. Also were it not for the friendly enthusiasm of his associates, this sketch would be brief indeed. Of his 43 years of life, 28 were given to the company he now serves. His experience should be a wholesome inspiration to those who question whether conscientious, persistent well-directed effort brings success.

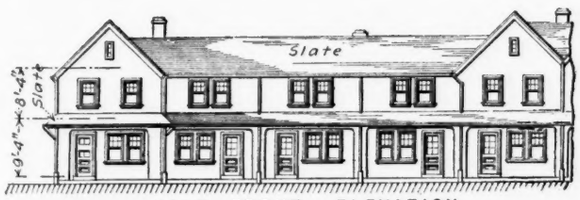
There is no fuel that will burn almost completely without any combustion space. No matter how much the volatile content of the coal is decreased, the combustion space cannot be decreased beyond certain limits except at the expense of completeness of combustion.—*Bureau of Mines Bulletin No. 135.*

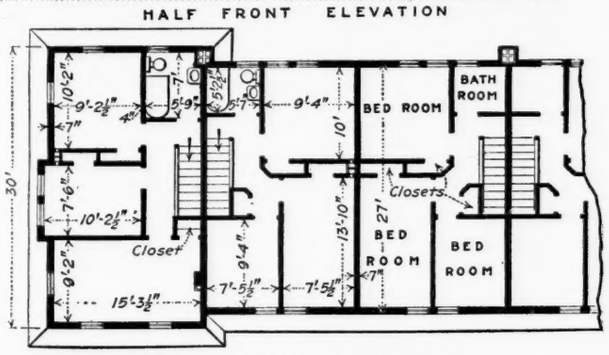
Balloon Framing with Concrete

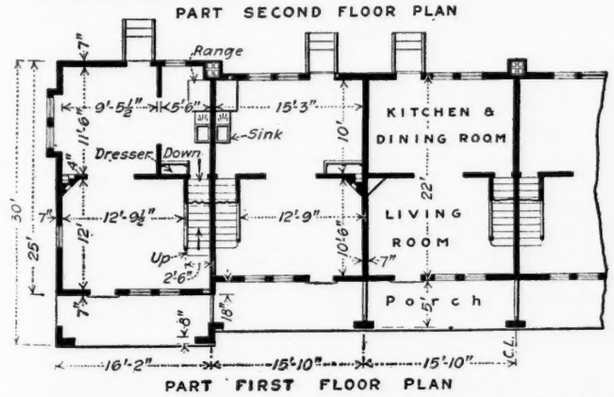
SYNOPSIS — *Concreting has been successfully applied to balloon-frame construction. All the wood used in the forms is left in the building, but little of such wood is needed. The building when completed is a shell of gunite or cement stucco supported on a concrete framework, the whole forming a monolithic unit. For the inside of the outer walls, the party walls and partitions either gunite, cement stucco or plaster may be used.*

THE value of concrete for resisting fire and keeping down vermin gives it a peculiar value as a building material. But there are difficulties in the casting of solid walls, and these difficulties make the building of all-concrete houses trying and expensive. Moreover, walls which are not double are apt to be wet. So some have sought an intermediate plan in which the framework is of wood and the outer and inner coating cement stucco with wire reinforcement.

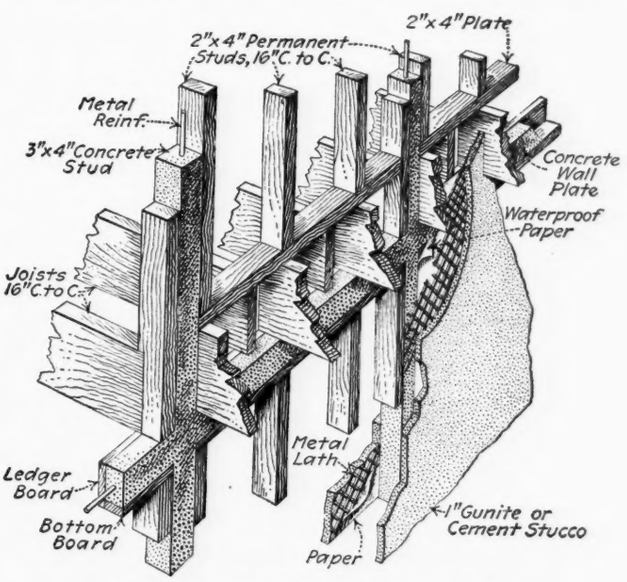
Emile G. Perrot, of Ballinger and Perrot, architects and engineers of Philadelphia, Penn., has successfully schemed out a house with concrete studs, floor plates and caps as well as a wall surfacing of cement stucco. This sounds complicated, but the matter is comparatively easy. You have walls that do not shrink and are reasonably fireproof and you have floors which, though not fireproof, have the merits of springiness and comfort, qualities which are not afforded by the unyielding concrete floor, which is better suited to a factory than a dwelling. The plan and construction methods are under consideration for use in the large-scale housing work about to be started by the government.







PART FRONT ELEVATION AND FLOOR PLANS OF TEN-UNIT HOUSE WITH CONCRETE STUDS



PERSPECTIVE SHOWING PARTY WALL

The bids which have been received show that houses, at present prices for labor and material, can be built in ten-unit rows, as sketched herewith, for $2500 per house of six rooms. This figure includes the cost of the hot-air furnace and of the piping for heating purposes. The price is as low as was bid for the construction of a precisely similar house of wood-frame construction and shingle covering and $100 lower per house than was asked for the construction of the houses when 8-in. brick walls were specified for exterior and party walls.

After the cellar is excavated a stone or concrete foundation wall is built in the ordinary way. The first-floor wood joists are then set in place on the foundation walls. On these joists a wood frame consisting of studs, joists and rafters is erected much in the manner customary when building the skeleton of a frame house.

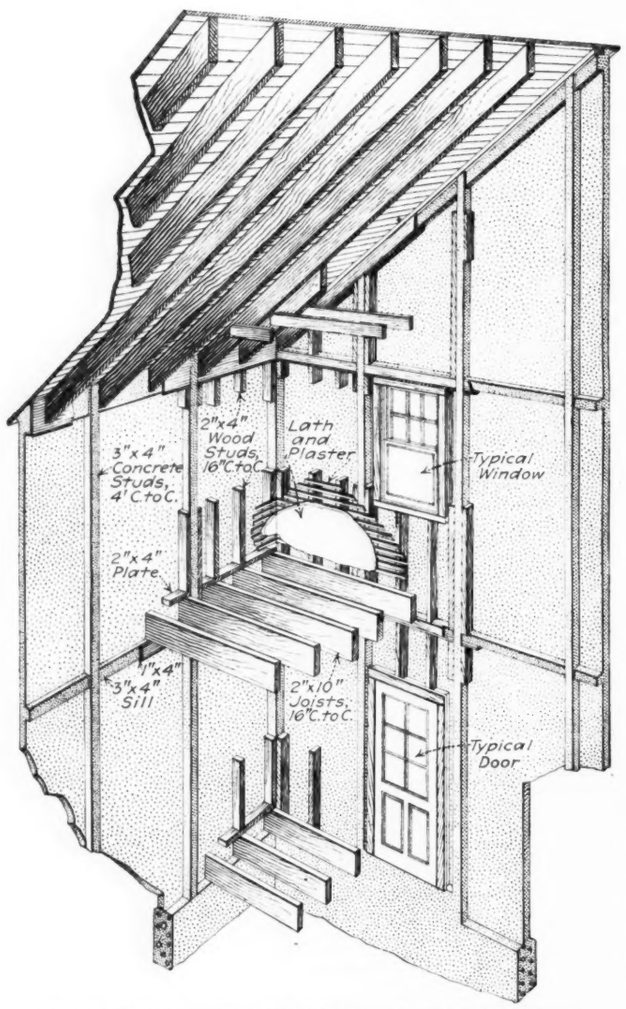
Every fourth stud is doubled, a 3 x 4-in. space being left between the two parts. This space is to be filled with concrete to form a concrete stud, as soon as the roof of the building is in place. At the level of the second floor a ledger board (or board set on edge) is placed over the tops, of the wood studs, its outer edge flush with one side of the studs; either side will do, if a party wall is being constructed, but the inside must be chosen, if an outside wall is being built. A bottom board is also laid flat on these wood studs, its edge butting against the ledger board. When the concreting

reaches this point, the cement gun is directed at the angle between the ledger board and the bottom board and the beam is easily built up by the gun in the shape shown in the perspective view of the party walls.

Before concreting commences heavy waterproof paper is stretched all over the studs on the outside of the exterior wall which is then covered by metal lath. The gunite coating is built up on this metal lath and is made from 1½ to 2 in. thick. At the same time the studs and wall plates are concreted. If, for any reason, the cement gun is not available, the continuous vertical studs and wall plates can be poured with concrete and the exterior metal lath coated by hand with 1:2 cement mortar.

However, the work is not so good as if done by the cement gun for gunite concrete is 33 per cent. denser than ordinary poured concrete and about twice as strong. Color effects may be obtained by adding mortar stain to the concrete while it is being mixed. No further treatment of the exterior wall surface is needed.

In the illustration showing the details of the party wall gunite or cement stucco is shown as the material used. Where cement stucco is adopted the waterproof paper can be dispensed with, the cement stucco being readily built up on the metal lath. The architect will possibly prefer to use neither gunite nor cement stucco but plaster for the inside, party and partition walls.



CORNER OF THE LAST HOUSE IN BLOCK OF TEN

Because only a few wood studs and all the concrete studs are shown it is not to be assumed that the wood studs are removed before the lath and plaster or cement stucco surface is placed.

Plaster is not so hard as cement stucco and in consequence interior wood finish, picture moulds, etc., can be more easily nailed in place than they can be with cement surfaces. The plaster can be put on wood, instead of metal, lath if desired. Of course, with such plastered surfaces on the inside walls the dwelling is only semi-fireproof because a fire on the inside of the dwelling is not protected from spreading. The outside wall being protected by gunite or cement stucco is, of course, fireproof, and there is thus protection against exterior fire hazards, but not against those from within. Wherever, as in a factory, no wood trim is desired the cemented surface may well be found preferable.

In order to reduce the fire hazard the interval between the joists on the foundation wall and on the wall plate of the second-story floor may be filled with concrete up to the underside of the flooring, the thickness of the fire stop being the same as that of the studs, namely 4 in.

The rapidity with which this type of house may be erected is dependent only upon the number of cement guns put into simultaneous operation or, if the work is done by hand, upon the number of workmen employed at any one time. After the framework of any number of houses is erected the cement can be applied without any interruption. It is not necessary as in the concrete construction to shift the men and their materials forward and back till the work is completed.

Furthermore, the many cracks so common to all other forms of concrete construction are entirely eliminated because the vertical concrete studs carry all the load and consequently there is no shrinkage or settlement to contend with, the structure being monolithic.

Where the party walls are of stucco or gunite a skim coat of plaster is applied to the cement as a finish. This method of surfacing the walls of a room saves about 8c. per square foot over the usual plastered surface. Whether the interior is gunited, hand-coated with cement stucco or plastered in the ordinary way the methods of construction compete quite successfully with those used in building a frame dwelling, especially now when wood is expensive and difficult to obtain.

Automatic Anthracite Coal Jig Control

The accompanying illustration shows an automatic control for slate and refuse elevators as attached to the common types of anthracite coal jigs. As may be seen in Fig. 1, the device embodies a perforated cylinder or float, which in operation rides on the surface of the slate or refuse while in process of jigging, the object being that after the slate rises to any predetermined height in the jig chamber or compartment. this float rises with the slate and automatically releases a spring (Fig. 2), thereby engaging a clutch. This starts the slate elevator and so removes the slate in the jig chamber, allowing the float to settle again. This settlement causes a nut to come in contact with a worm gear, disengaging the clutch, and so stopping the slate elevator.

It will be readily perceived that the elevator will remain idle until enough slate or refuse has again accu-

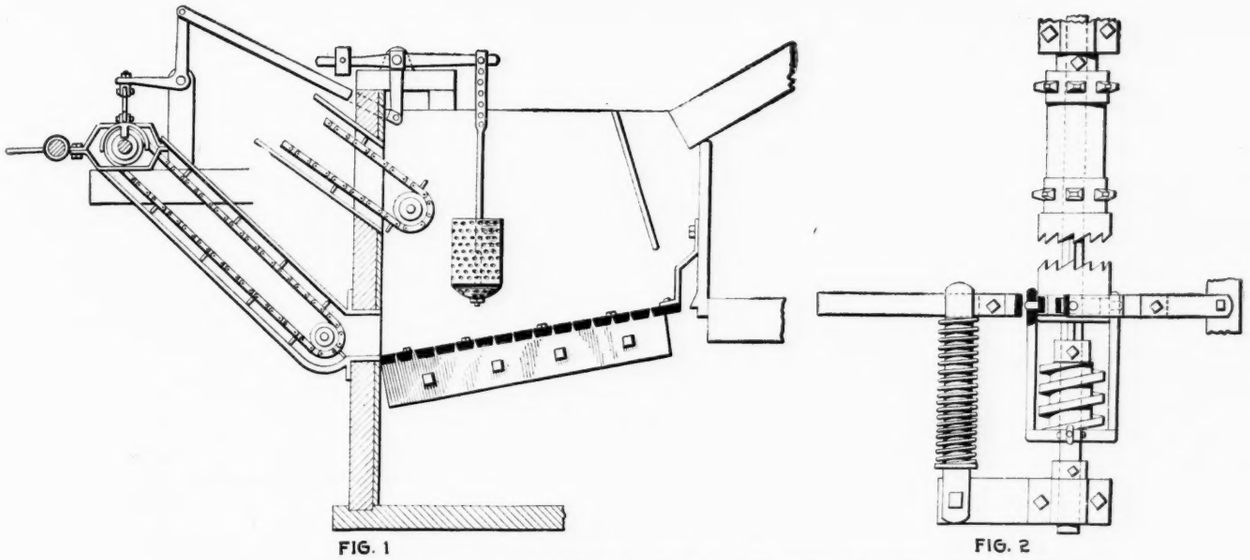


FIG. 1 FIG. 2

FIGS. 1 AND 2. AUTOMATIC JIG CONTROL FOR SLATE AND REFUSE ELEVATORS

mulated to cause the float to rise, and thereafter automatically repeat the operation. An important economic feature of this device is that one operator is enabled to care for a battery of 15 jigs where in ordinary operation not employing a control of this character one man is required to attend each 2 or 3 jigs. Once installed and operative, the jigs become entirely automatic, and the device here shown is so simple and "foolproof" as to insure continuous operation at very low cost for upkeep.

This controlling device was invented and patented by Reynolds and Brown, of Forty Fort, Penn. Practical installations have been in operation at several collieries of the Temple Coal Co. for about one year, where they have proved entirely satisfactory. The results have shown an increase over the normal capacity of the jigs, and a greater general efficiency as compared to the operation of standard jigs not equipped with controlling devices. The Cross Engineering Co., of Carbondale, Penn., manufactures this control.

W. M. Chase

NO ONE has reason to expect success who does not connect himself from the first with concerns having a modern way of doing business. A broad view of any industry can never be formed by association with companies that hesitate to travel on a new high road and which begrudge the expenditure necessary to bring their properties up to date. Some persons start life in the deep rut of niggardly and narrow-minded methods, and from these methods and the habits of mind that go with them escape is usually impossible.

W. M. Chase, who was born at Lynchburg, Va., in 1881, was fortunate in having modern operations and competent leadership from the start of his career. In 1898 he started work with the Berwind-White Coal Mining Co. He stayed with them 14 years and then affiliated himself with the Lackawanna Steel Co.'s mining interests at Ellsworth and Wehrum. In the service of both these companies he had an opportunity to see coal-mining practice in the making. Not that progress in the coal industry is all the impatient would have it, but because the Berwind-White and Lackawanna were in many, many ways among the leaders in that progress in both mechanical and sociological lines.

From the Lackawanna interests he went to the Cambria Steel Co.'s mining department at Johnstown, Penn., another progressive organization. When Harry T. Meehan became managing partner of the firm of Cosgrove & Co., Mr. Chase was selected as general manager of the Union Coal and Coke Co., to succeed Mr. Meehan. In doing this Mr. Chase goes back to a neighborhood

W. M. CHASE

with which he is quite familiar. The Union Coal and Coke Co. owns the Marianna and Acme mines, the properties of which abut on either side the properties of the Ellsworth Collieries Co., with which Mr. Chase was for some years identified. The Hazel Kirk mines 1 and 2 are on the same line of road, somewhat nearer to Monongahela. At the latter town is another of the Union Coal and Coke Co.'s mines, the Schoenberger. The other two mines, Penn Manor No. 1 and 5, are in Westmoreland County at Manor and Claridge, Pennsylvania

Mechanical Mining Without Explosives

By N. D. LEVIN
Columbus, Ohio

SYNOPSIS—*A machine that cuts, breaks down and loads coal has been tried out in several fields and several coal beds. The use of this machine decreases the cost of entry driving, makes mining safer and secures a normal output in a short time after opening the mine.*

AT THIS time, when there is a larger demand for coal than ever before in the history of the world, a study of the performance of an entry-driving machine will be of interest. Since 1910 systematic research work has been carried on; experimental machines have been built and tested in several coal beds in various states. This work has resulted in the development of a machine that performs all the operations required in mining coal and loading it into the pit cars without the use of explosives or hand labor.

One machine has been in practically daily operation for two years, and additional ones are now being installed in the same mine. The coal in this mine is overlaid by a heavy layer of drawslate that comes down as soon as the coal is removed. The handling of this slate takes a large percentage of the time, and therefore the production is limited. Careful time studies have been made of the operation of this machine. Table I is an example of one of the daily reports made by an engineer whose duty it was to keep track of the time.

A short description of the machine will assist in understanding this report. Fig. 1 shows a front view of the machine. It operates on the same principle as a breast machine; the first or sumping cut being made at either rib, usually the left. It is fed forward in a stationary pan, making a cut 5 ft. wide, 7 ft. deep and of a height to suit the coal bed. The coal in the above-mentioned mine is 5 ft. 8 in. high. The machine has an undercutting chain with cutter head similar to that of a breast machine, and two shearing chains, one on each side. The frames carrying these shearing chains can be varied for different heights of coal. Between the shears is mounted a frame carrying a number of heavy punching picks. This frame is readily raised and lowered by the operator, who can cause the picks to strike at any height he desires. The coal falls onto a conveyor which is made thin enough to go into the kerf cut by the undercutting chain. This conveyor carries the coal to the rear end of the machine and dumps it into a second conveyor, which is mounted so that it can swing at any desired angle to the machine.

After a cut is made, the machine is moved sideways by means of a rope hitched to a jack at the opposite rib and then another cut is made. When slate is to be piled up at the side of the room the rear conveyor is swung sideways, the slate rolled onto the front of the machine and gobbed by the two conveyors.

If we analyze the daily report we find that on this particular day it took an average of 13½ minutes to make a cut, and about 3 minutes to move the machine to the next cut, or about 16 to 17 minutes time for each cut. There were 45 cars of coal loaded and 13 cuts made, therefore each cut gives about 3½ cars. The cars hold nearly two tons of coal, which means at least six tons per cut and 21 tons per hour. This rate of mining and loading can readily be maintained if conditions in the mine are such that the machine

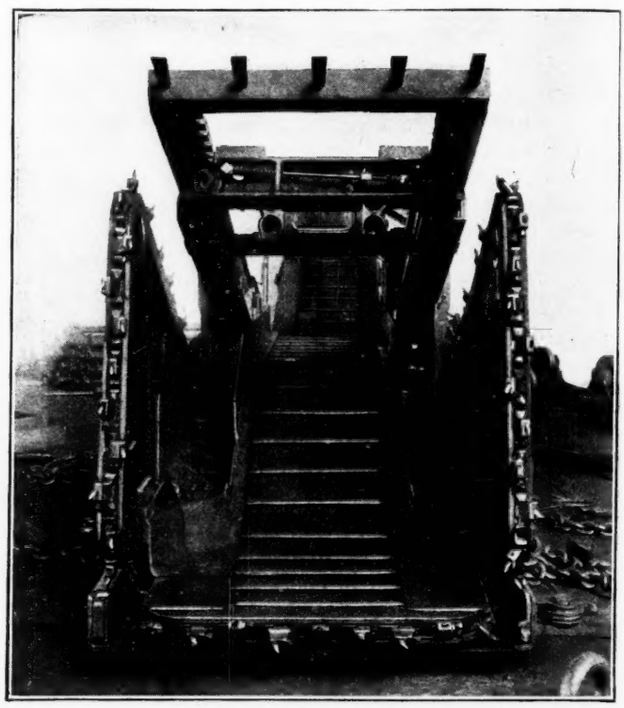


FIG. 1. FRONT VIEW OF THE MACHINE

can be kept in steady operation, which is not possible with heavy drawslate. Where the roof conditions were good the machine has loaded 30 tons an hour in this mine.

Fig. 2 shows the machine ready to start a cut. The jack and rope for pulling the machine over for the next cut are plainly seen. This photograph shows the pipe posts that are used with the machine. These posts can be set in a small fraction of the time that would be required for setting wooden posts. As the machine advances, wooden posts are put in to take the place of the pipe posts.

Fig. 3 shows the coal being delivered to the swinging conveyor. Figs. 4 and 5 show the swinging conveyor delivering coal to a storage hopper. This hopper holds about three tons, and is provided with a conveyor that will empty it in about a minute. There is a separate motor on this hopper for operating the conveyor. A starting box for the motor is at the rear end of the conveyor, conveniently located for the driver who stops and starts the hopper conveyor as required in loading the car. There is also mechanism on the hopper for moving the car its own length so that the driver can load the car without assistance. The machine crew pay no attention whatever to this part of

the work. The storage in the hopper gives the driver sufficient time to change cars and keep the coal away from the machine. This hopper conveyor is of more importance than one would think.

TABLE I. DAILY REPORT

7:00 a.m.	to 7:50 a.m.	Clearing slate and bottom coal
7:50 a.m.	to 8:05 a.m.	Cutting and loading coal
8:05 a.m.	to 8:17 a.m.	Move machine and set posts
8:17 a.m.	to 8:30 a.m.	Cut and load coal
8:30 a.m.	to 9:02 a.m.	Move and set machine for sumping cut; set bits; clear slate; dig up bottom coal and replace bent jack pipe
9:02 a.m.	to 9:25 a.m.	Cut and load coal and pick out slate that fell on top of the machine
9:25 a.m.	to 9:28 a.m.	Move machine
9:28 a.m.	to 9:41 a.m.	Cut and load coal
9:41 a.m.	to 9:51 a.m.	Cleaning slack out of teeth of crank gear*
9:51 a.m.	to 9:56 a.m.	Move machine
9:56 a.m.	to 10:07 a.m.	Cut and load coal
10:07 a.m.	to 10:09 a.m.	Clean slack conveyor
10:09 a.m.	to 10:16 a.m.	Move machine and set roof posts
10:16 a.m.	to 10:27 a.m.	Cut and load coal
10:27 a.m.	to 10:32 a.m.	Tighten brake band an pick drum
10:32 a.m.	to 10:52 a.m.	Clearing slate and bottom coal
10:52 a.m.	to 12:07 p.m.	Cut and load coal
12:07 p.m.	to 12:37 p.m.	Dinner time
12:37 p.m.	to 12:55 p.m.	Move machine and shovel loose coal and post room
12:55 p.m.	to 1:06 p.m.	Cut and load coal
1:06 p.m.	to 1:20 p.m.	Move machine and shovel loose coal
1:20 p.m.	to 1:35 p.m.	Cut and load coal
1:35 p.m.	to 2:00 p.m.	Move and set machine for sumping cut, clear slate and dig up bottom coal and reset roof posts
2:00 p.m.	to 2:17 p.m.	Cut and load coal
2:17 p.m.	to 2:20 p.m.	Move machine
2:20 p.m.	to 2:33 p.m.	Cut and load coal
2:33 p.m.	to 2:37 p.m.	Move machine
2:37 p.m.	to 2:51 p.m.	Cut and load coal
2:51 a.m.	to 2:56 p.m.	Move machine and oil crank gear gearing
2:56 p.m.	to 3:10 p.m.	Cut and load coal
3:10 p.m.	to 3:30 p.m.	Shovel loose coal and take down slate and post up room safe for night

*A guard has been provided to keep the slack away from the gear.

From July to October, 1913, the first machine of this type was operated in another district, driving an entry where the roof conditions were all that could be desired, but all that time there was no hopper conveyor used. It was found that regardless of every effort on the part of the machine runners and the mine foremen, there was an average of 5 minutes wasted each time a car was changed. Nevertheless an output of as much as 120 tons per shift of 9 hours was obtained with an average of 60 tons per shift for the three months that the machine was operated. Since that time many improvements have been made in the machine, and the hopper conveyor added, therefore a much larger output should be expected.

The use of mining and loading machines will materially change the coal-mining industry. A property that, with the present system, takes years to develop, can be opened up in a short time by the use of mining and loading machines. As soon as the overhead equipment, shaft or slope is ready, it is simply a question of putting in a sufficient number of machines to obtain the desired output. The work can be concentrated and the output obtained from a small territory.

Opening a New Mine

If we assume that a coal property of about 5000 acres averaging 6 ft. of coal located in the lower Monongahela River section of the Pittsburgh district is to be opened, the panel system of room-and-pillar mining would probably be decided upon as being the best adapted to the conditions to meet maximum recovery and safety in operation. It would probably be desirable to obtain an output of 3000 tons per day, which would exhaust the property in somewhat over 20 years.

To provide for the enormous volume of air that would be required as the mine advances it would probably be necessary to drive six face entries in the center of the property. If the entry work is pushed hard, and all entries worked double shift, it would probably take three years to develop the mine sufficiently to obtain an output of 3000 tons a day. On the other hand, if the same property were to be opened with a view of using mining and loading machines, it would probably not be necessary to plan for more than two or possibly three face entries. Two butt entries could be started immediately and worked to the end of the property, one machine to each entry.

The machine when driving an 11-ft. entry has averaged 20 ft. advance per shift of 8 hours under rather unfavorable conditions. There was a considerable

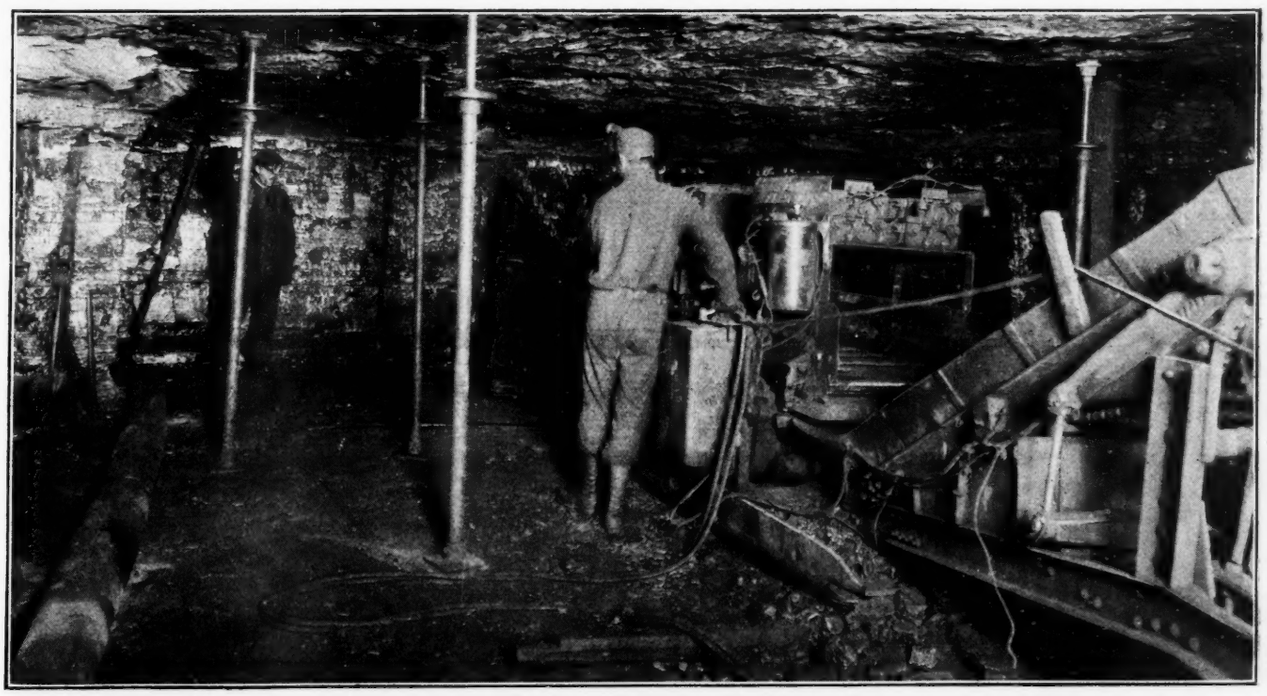


FIG. 2. THE MINING MACHINE READY TO START A CUT

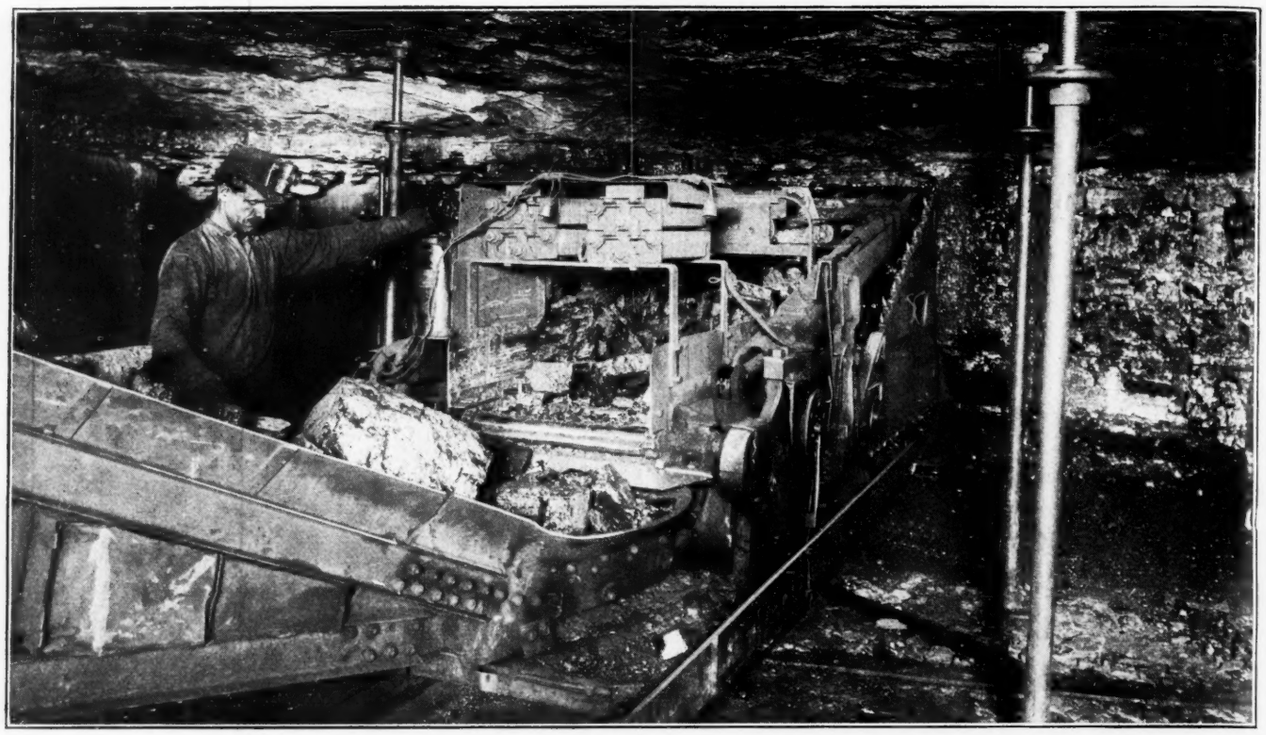


FIG. 3. REAR VIEW OF MACHINE, SHOWING COAL ENTERING SWINGING CONVEYOR

amount of sulphur in the coal, and the machine was handled by a crew unskilled in the work of pushing the work; also, the personnel of the crew was frequently changed. It is safe to assume that if the machines are worked double shift, they will advance 40 ft. each 24 hours. This being the case it would be desirable to drive to the end of the property and work back. As soon as a pair of entries are given, as many rooms as desired can be turned off. In the meantime another pair of entries can be started. It is desirable to cut very few breakthroughs in the entries in order to save expense of building fireproof stoppings. The breakthroughs may be driven on 250-ft. centers. In this case air is supplied to the machines by canvas tubes and a small electrically driven fan placed in the nearest breakthrough. A tube of this kind is shown in two of the accompanying illustrations. These machines should be worked double shift. Between shifts they

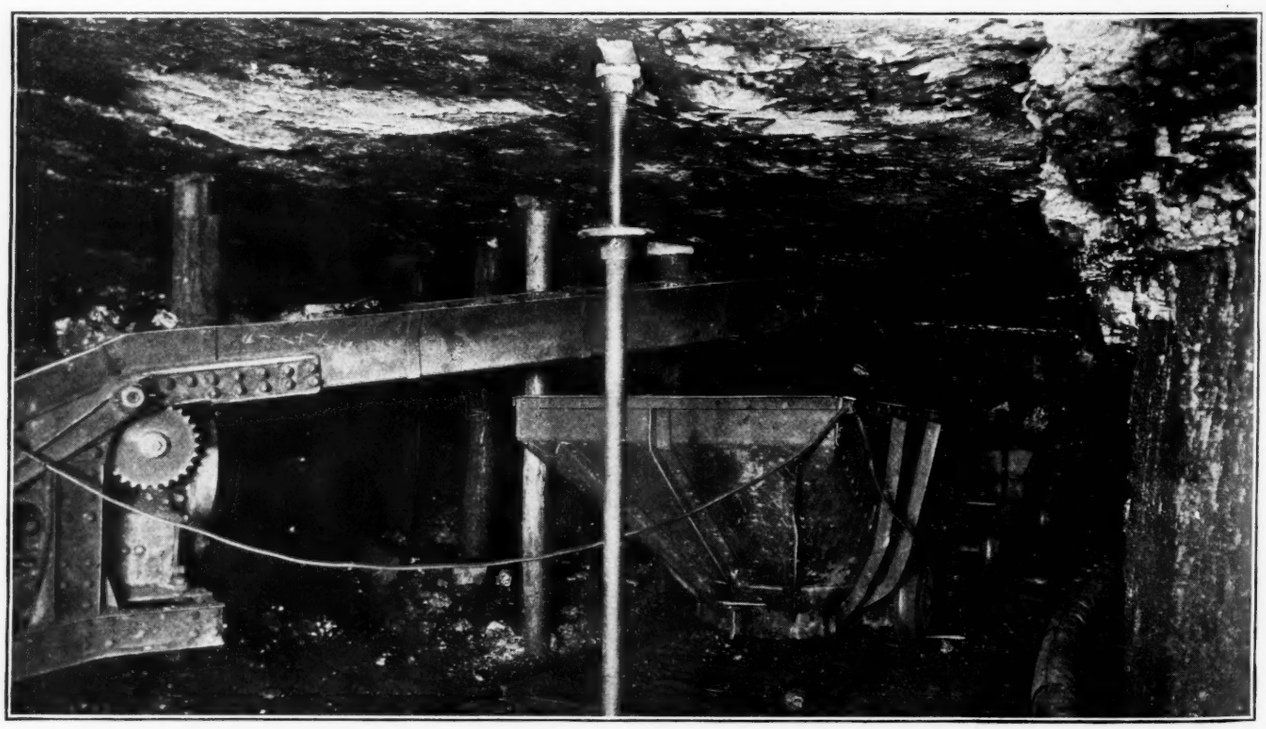


FIG. 4. REAR OF CONVEYOR, STORAGE HOPPER AND CAR

should be oiled, looked over in a general way and the bits reset.

If we assume that each machine working in a room produces 60 tons per shift, or 120 tons each 24 hours, and each machine on entry work produces 40 tons per shift, or 80 tons every 24 hours, there would be 22 machines required for room work and four machines for entry work for the mine in question. Consequently, to obtain 3000 tons per day would require only 22 rooms and four entries at one time. If the mine is laid out along the line of present practice about 350 rooms and 30 to 40 entries would be required to maintain an output of 3000 tons per day.

It can readily be seen that an enormous saving can be made in track and trolley material, overcasts, fireproof stoppings, turning room necks, timbering, drainage, ventilating equipment, locomotives, mine cars, mules, etc.

FIG. 5. COAL BEING DELIVERED TO THE STORAGE HOPPER

The crew for each machine consists of a machine runner, a helper and a driver. If the slate is heavy, it may require an extra man for handling this material. The same class of men that make good shortwall machine runners make good men for the mining and loading machine.

There is less danger of roof falling where the mining and loading machines are used. The machine stays in the room until it is worked out, which is a comparatively short time, probably three to four weeks. On account of this condition the expense of timbering should also be decreased to a marked degree.

In a mine of the kind outlined there would be few entries that they could be inspected frequently and kept in a safe condition. No explosives would be used in a mine equipped with mining and loading machines, and there would thus be no danger of blownout shots which often cause dust explosions. All accidents due to careless handling of powder and carelessness in shooting would be entirely eliminated.

When a section is worked out, it could be closed up permanently. Thus only a small section of the property would be worked at a time, making it easy to ventilate and keep down the dust.

To analyze the cost two mine maps were laid out, one for the mine using entry driving machines and the other the present system of room-and-pillar work. On these maps were marked the advance of working faces for each month until 3000 tons per day could be obtained. Equipment, track material, etc., were tabulated for each case and probable pay rolls were made up.

It was found that the outlay for equipment and the expense of opening a mine with mining and loading machines was about the same as with the present system, if it was assumed that the machines loaded only 60 tons per shift, in the rooms. Conditions must be unfavorable if the machines do not load more. If an output of 100 to 150 tons per machine is obtained, which is quite probable, then the saving in the first cost will be much in favor of the mining and loading machine. The figures show a saving of 32c. per ton by using the machine in entry driving.

In obtaining these figures it was assumed that conditions were unfavorable and that the machines produced only 40 tons per shift in rooms and 30 tons per shift on the entries. The machines have averaged much better than that where the slate handled was 2 to 4 ft. thick.

In a mine equipped with mining and loading machines the cost will not increase from year to year as the mine is being worked out, as is the case with the present system. The workings will always be concentrated. Only main haulage will become longer, and this will not materially affect the cost.

From Switchman to Coal Operator

Biographical Sketch of Frederick W. Lukins, President of the Southwestern Interstate Coal Operators' Association

GRAY matter, energy, a level head and a sense of proportion that provides an appreciation of the other fellow's point of view—these are the chief qualities that have characterized the progress of Frederick W. Lukins, from switchman on the Chicago, Burlington & Quincy, at Streator, Ill., in 1881, to coal operator and president of the Southwestern Interstate Coal Operators' Association.

Fred Lukins, with the commonest of common school educations, was a husky lad and naturally drifted into a switchman's job at home; but he had ambition. He edged his way into the freight office of the railroad; next he was made secretary of the Riverbank Coal Co., a producing concern. He joined forces with Jim Cavanaugh, who was also energetic and ambitious. They formed the coal-producing firm of Lukins & Cavanaugh and bought a drift mine on time. Cavanaugh looked after the operating end, hauling coal from the drift to the dump, from which it was hauled by wagon to the cars. Lukins looked after the business end of the company. After two years Lukins gave up his regular job with the Riverbank company. He and Cavanaugh bought another mine where they raised coal with a gin; they dumped it into a tram car in which they hauled it to the railroad.

F. W. LUKINS
Has gray matter, energy, level head—and appreciates the other fellow's point of view

In 1887, after three or four years of the hardest kind of work, they reached the climax of their efforts, opened another shaft, equipped it with a steam hoist and loaded coal into the cars direct. Meanwhile, however, they added other strings to their bow. They had a brick manufacturing plant and they also formed a partnership with Mulford, a contractor, whom they bought out.

In 1893 Mr. Lukins sold his interest to Mr. Cavanaugh, and with T. C. Loucks, of Chicago, organized the Chicago-Virden Coal Co. They bought a coal mine at Virden, equipped it with modern machinery, and went to work in earnest. The first year they would have made the record for the biggest output of the state, except for a railroad rate war in which their railroad did not participate. The second year they produced the highest annual tonnage in the state at that time, 350,000 tons. Then they bought out the Sugar Creek Coal Co. at Auburn and also a mine at Chatham. This gave them a total production of 5000 tons a day. They ran these properties until 1905, when they consolidated with the Pittsburgh Coal Co., whose properties were at Springfield, Virden, Litchfield and Sorento. Mr. Lukins had been vice president and general manager of the Chicago-Virden company; he was made general manager of the new combination, the Illinois Collieries Company.

On the first of April, 1907, Mr. Lukins resigned his position with the Illinois Collieries Co. to become the general manager of the O'Gara properties. These included the O'Gara Coal Co.'s thirteen properties in Saline County, Illinois, also the mines of the Vivian Collieries Co., the Imperial Mining Co. and the O'Gara Coal Mining Co., the latter companies having ten mines in Illinois, Indiana, Ohio and West Virginia. The O'Gara companies soon developed the largest output of any concern in the central west at that time. There were more than twenty mines scattered over four states. Production was greatly increased under Mr. Lukins' management. The Saline County property, for instance, rose in five years from 4000 to 15,000 tons daily. In another of the properties Mr. Lukins increased the production from 800 tons a day to 1200 within a month's time, without any increase in the day labor cost.

When the five-year contract was up, Apr. 1, 1912, Mr. Lukins was ready to take a rest. He had been thirty years in harness and he wished to give up the coal business, moving to one of his ranches in Colorado. He was there only a year when pressure was exerted to get him back into coal again. He finally took the general managership of the Waverly Coal Co., which has extensive interests at Waverly, Mo. These mines had been idle for some time and finally had been purchased by an English syndicate.

When Mr. Lukins had been back in Streator, Ill., as a young man, he had come in contact with the high grade coal from the east and with cheap coal from the south. He then resolved that eventually he would handle either the highest grade coal or the cheapest. Later, in the Virden company he had had a chance to mine cheap coal successfully. But out on the ranch he decided that what he really wanted to do was to handle a high-grade product. When he came to Kansas City in 1913, as manager of the Waverly company, he bought the properties of the Farmers' Fuel Co. at Higginsville, Mo., and reorganized it. This company had been selling Red Label coal for more than 30 years in its territory. Mr. Lukins, in 1916, bought another mine in the same field, which gave him control of that field and of the type of coal which had been sold as Red Label for so many years.

Coal men will remember the Virden riots of Oct. 12, 1898. These were the culmination of a strike on the Chicago-Virden properties which had lasted through that summer. That trying experience matured Mr. Lukins' sympathy as well as his judgment with refer-

ence to the unions and the general purposes of organized labor. This sympathy was not purely theoretical, but has been practically applied to dealings with unions over many years.

Mr. Lukins was one of the first members of the Illinois Coal Operators' Association, organized in 1898, and was on the scale committee from the beginning. He served two terms as vice president of that association and was continously on its executive committee. After coming to Kansas City he was continued on the scale committee because of his knowledge of practical mining matters and his faculty for getting along with the men. In 1917 he was vice president of the Southwestern Interstate Coal Operators' Association for Missouri, and this year is its president.

Mr. Lukins does not confine his sympathy for organized effort and for conservatism to miners' organizations. He believes that operators should consider the square deal. He is consistent. When the Chicago Virden company was organized, he had that same idea which he now represents as president of the Southwestern Coal Operators' Association. The Chicago Virden company raised the day wages from $1.50 to $2 and the miners' scale from 50c. to 55c. in the face of opposition of operators who did not believe in paying any more than they had to.

The question was asked Mr. Lukins, "What is the secret of success?"

"It's hard to say," he said, "why one man fails and another gets ahead. Two essentials to success are gray matter and energy. But there are plenty of smart fellows who work hard enough and yet do not seem to gain a permanent advantage. Perhaps it is because they lack balance."

Anyone knowing Mr. Lukins could hardly avoid observing that he never is apparently in a hurry; he always has time for anything that needs to be done; he goes straight at the task, and every move he makes and every word he says carry him closer to the accomplishment of the result aimed at. If one remembers the big things Mr. Lukins has done, the many phases of complicated industrial problems that he has so ably kept in hand, his competent grappling, not only with financial and operative, but with the human element of coal and mining and marketing, one can hardly fail to recognize him as a man of genius.

Success of the Coal Mining Engineer

By E. I. ROBERTS
Alberta, Canada

THERE is great diversity of opinion as to just what constitutes a mining engineer. If the question were asked, "What is a coal mining engineer, as commonly understood around a coal mine?" various answers will be received. The majority will probably say, "Why, he is the man who does the surveying." From others, "Well, he is usually around when there is some concrete work to be done." Still another explanation will be given by others.

As a general rule, however, the definition of "coal mining engineer," as it is usually given and understood around the various coal mining fields, does not give as complete or as full a credit to the name as it deserves. Wherein lies the reason for this? Is it with the coal companies, or with the mining engineer? The writer ventures the opinion that it rests with the engineers, as professional men, to change this general understanding. It is of course realized that mining engineering comprises a little of all branches of engineering; in some cases a lot of some particular profession. It is probably due to this diversity of engineering requirements around coal mines that the general engineer has confined his efforts to surveying. The primary requisite, then, is adaptability on the part of the engineer.

There is a decided trait among certain young college graduates to still cling to the college fraternities—too much Alpha Beta. This trait tends to injure their own future and also the future of coal mining as an engineering profession. This all tends to a waiting for opportunity—to a craving for the unearned respect of those who have never had the chance to be an Alpha Beta. Coal mining is too hard a game and contains too many strong, able men to give respect to a name alone. This brings us to the second requisite for success—push and initiative. The graduate, on first leaving college, encounters a cold, and sometimes unsympathetic world, particularly when he enters the coal mine. The guiding hand of his professor is withdrawn, and sometimes it almost seems to him as though the source of all his knowledge has been cut off. He may temporarily forget that his professors strove to impress on him the necessity to think for himself. College aims to make men think—textbooks are mainly for reference, after their contents have been mastered. This all tends to call attention to the third requisite, that of confidence in himself.

Many times training is not considered at all—it may be presupposed that this quality has been given to the young engineer during his college days. Further, it has been said that engineering is one part mathematics and nine parts common sense. In the mind of the writer, the training for any particular application of engineering can be acquired at the time necessary for the training to be applied. Provided, of course, that the foundation is there. It is rarely the case that a university gives any man more than a foundation, the rest comes from the continued application, built up on this foundation.

In the past the duties of a mining engineer too often have been largely confined to one or two small branches of the profession—that is, surveying and platting. Occasionally he may have been used to look after the construction of a concrete wall. Or, if he was out of work, he may have been instructed to help in the office or in any department where a little clerical work was needed. Finally, when the company retrenched, the mining engineering department was the one largely dispensed with.

A person realizes that to survey properly is a worthy attainment—to be able to make an accurate map, an actual necessity. But it seems ridiculous that it should require four years' technical training and subsequent practical knowledge to run accurately and plat neatly a simple traverse in a coal mine. Yet this is what is expected of the engineer by the majority of coal operators and officials. It would be quite as reasonable to expect an electrical engineer to devote his entire time to the splicing of cables, or a mechanical engineer to the firing of a boiler. Each of these duties is a necessity in the respective lines, but they do not constitute the professions of electrical or mechanical engineering. Still, a similar necessity in the mining engineering field is expected to constitute the whole. It is up to the mining engineer to change this view. And may it not be a lack of one or more of the requisites for success above mentioned which is responsible for this understanding of the profession?

Of all modern industrial organizations, coal mining is occasionally the least efficient. A coal mine power plant may still use fire-tube boilers, and most boilers are hand fired. Such devices as carbon dioxide recorders are the great exception, similarly with draft gages. The average coal company considers that the fuel used about the plant costs little. Again it is up to the mining engineer to present such matters to the company—show them the practicability of the devices in question—also that coal used at the plant should be an item on the cost sheet. All this before the company, waking up to the situation, sends for a mechanical expert to report to them on conditions which their own engineer might have pointed out.

Mine Engineer Should Investigate First

Before an electrical expert is demanded, let the mine engineer investigate how much leakage there is on the underground cables; whether the return is sufficient for the intake cables; is the bonding up to the mark. These are all matters that a bright, capable mining engineer can at least report upon up to a certain point—his investigations will be of value to his company. Again, a haulage accident occurs. What is the reason? Here is a chance for the mining engineer to make suggestions as to a remedy to prevent a recurrence.

In regard to the preparation of coal: Possibly matters are not progressing smoothly at the tipple. Slack may be going into the lump coal chute. There is too great a proportion of nut in the egg coal. Will the engineer measure up to this problem or shall the company send for an expert on such matters? Take the question of costs: If they are running high, is there a system in use which will spot the item causing leakage? If not, the engineer has an opportunity to show that a system of proper distribution of all expenses and revenues may change matters. He can anticipate the sending for accountants.

Is there labor trouble? What are the difficulties? Did the engineer make it his business to be on hand as a company representative? Efficiency engineers are being called from manufacturing fields to investigate, report and suggest methods that the mining engineer long ago should have investigated and at least partly remedied. Let us suppose that an engineer had installed definite time motion studies on the different operations of coal mining two or three years ago. This might have been of considerable value today.

It might be that the whole question could be summed up in the word "anticipate." Anticipate your own needs and sometimes the needs of the company will also be anticipated. All of this discussion points to the three qualities for success previously noted. Adaptability to the present needs, push and initiative to anticipate these needs and confidence to present the facts authoritatively.

To make a mistake once is pardonable; to repeat it, unfortunate; to let it happen the third or fourth time is to establish a habit. Bad habits are the stock in trade of weak-willed, self-indulgent, spineless individuals.

High Efficiency at Small Cost

By G. E. Alloway
Ironton, Ohio.

About one year ago C. O. Messenger took charge of the mine of the Eagle Gas Coal Co., at Vaughan, W. Va. At that time this operation had an output of about 50 tons per day. Mining was done by hand and hauling by mules, five of these animals being used to handle the output. A furnace was used to ventilate the mine—burning from four to five tons of coal per day.

As Mr. Messenger's capital for improvement was limited, he decided on the following equipment: One 25-hp. firebox boiler; one 22½-hp. engine; one 7½-kw. generator; one 6-ft. Stine disk fan; one 5½-ton Ironton storage-battery locomotive; one 3-in. suction 2-in. discharge electric-drive pump. His method of obtaining 100 per cent. efficiency from this small plant is as follows:

By using a pulley at each end of his engine shaft, he can drive the fan from one pulley and the generator from the other. He thus furnishes power for his pump during the day, and at night this machine is shut down and current is used to charge the storage-battery locomotive.

This equipment has eliminated all mules and has increased the output to 150 tons per day. The fuel consumed is really less than that formerly burned in the furnace. Besides these savings Mr. Messenger has been able to dispense with the services of a furnaceman, one man employed in bailing water and two drivers.

The 5½-ton locomotive is able to handle a train of 14 loaded cars (total weight of cars and load 27 net tons) over a grade 1500 ft. long and averaging 2 per cent. against the load. At some points for a distance of 25 to 50 ft. the grade is as high as 4 per cent. against the load. One man runs the engine and looks after the rest of the machinery during the day, while another during half a shift at night charges the locomotive and gets it ready for the next day's run. One motorman and a helper complete the force needed to operate this highly efficient little plant. Cars are of the plain bearing type, and 20 lb. rail is used on the main haulage.

I believe this is the most efficient plant in the coal fields of West Virginia, considering the small size of the initial investment.

Revolving Dumps at Docena and Edgewater

DURING the summer of 1906 it was decided to open a new mine in the Pratt seam lying due north from mines then in operation. The coal lay at a depth of 250 ft. from the surface, the average thickness being approximately 36 in. The operation is known as Pratt No. 12, or Docena Mine.

The standard Pratt car being too high for this thickness of coal, a new car was designed with an over-all height of 26 in. above the rail and a capacity of 2 tons; the usual swing door at the front end of the car was replaced by a solid end to prevent spilling of fine coal along the haulageways. This type of construction necessitated the use of a revolving dump.

The average output desired from the mine was 2500 tons in 10 hours. After due consideration it was decided to sink a two-compartment shaft, equipped with 6-ton capacity skips running in balance, and to install suitable dumping and loading arrangements at the bottom of the shaft.

After the plant had been in operation for some time, a test was made of the capacity of the revolving dumps, with the following results:

	Dumping Time	Tons per Hour
First trip—16 cars	5 min., 30 sec.	200
Second trip—18 cars	8 min.	165
Third trip—10 cars	2 min., 30 sec.	276
Fourth trip—22 cars	4 min., 45 sec.	318
ifth trip—36 cars	6 min., 45 sec.	368

The whole arrangement worked out satisfactorily, and when it became necessary to sink and equip Pratt No. 13, or Edgewater Mine, it was decided to use a similar arrangement. The following brief description refers to the Edgewater installation:

Referring to Fig. 2, the plan of the bottom shows the relative location of the car haul, car scales, revolving dump and hoisting shaft.

Electric locomotives deliver trips on the loaded sidetrack. After being uncoupled and passed over the scale by car haul, the cars acquire sufficient momentum by gravity to run into the revolving dump, displacing the empties therein. The car stop used is of the revolving type and is automatically operated by a reach rod from the incoming end by the loaded cars.

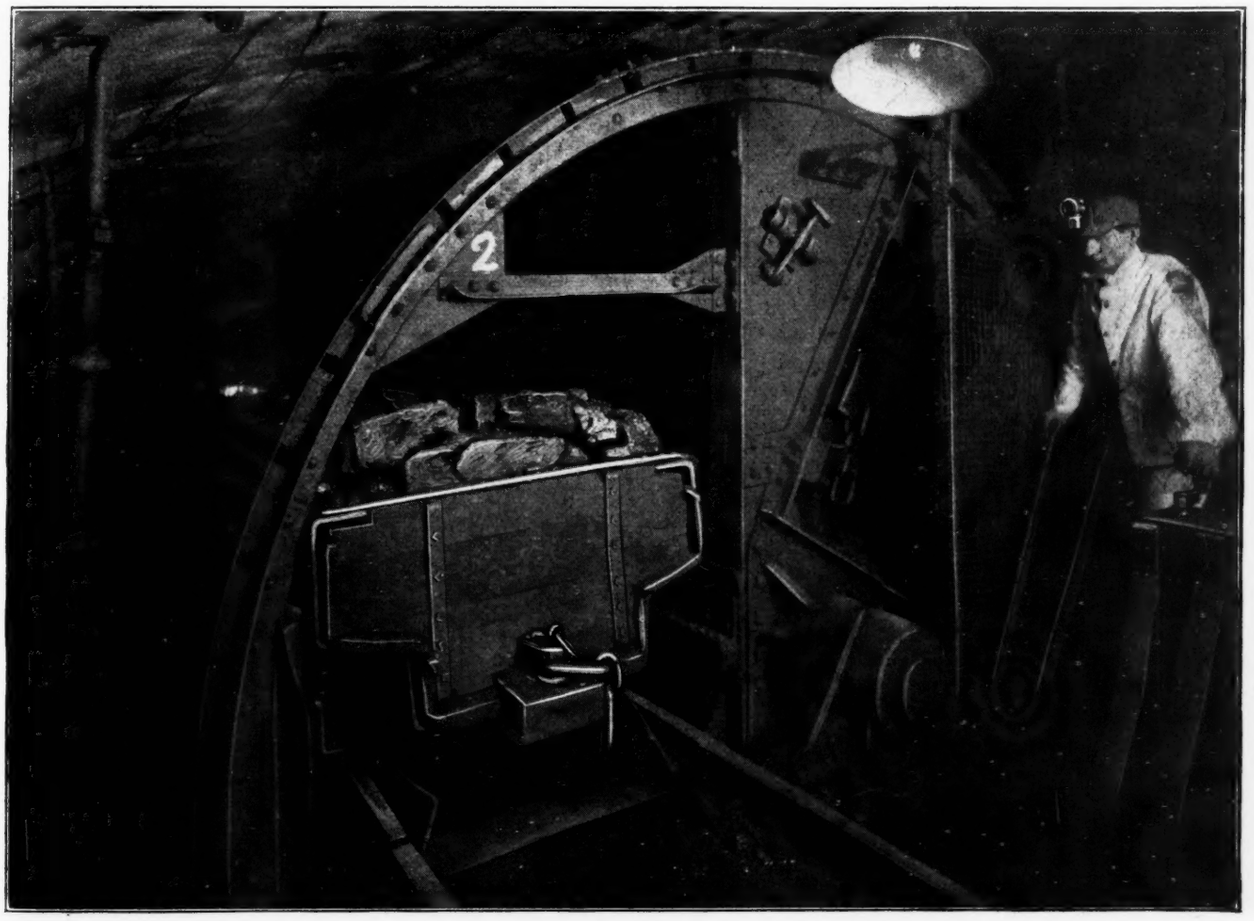


FIG. 1. THE THREE-COMPARTMENT DUMP IN OPERATION

As shown at *A*, the revolving dump has three compartments, each holding two cars, one-third of a revolution being required for each dumping operation. As it operates wholly by gravity, the cost of operation and upkeep is low.

The operation of the dump is controlled by a band brake on one of the spiders. Originally a positive stop was used to bring the dump to rest in the loading position, but it did not prove successful and was abandoned, the stop being now made wholly by careful operation of the brakes.

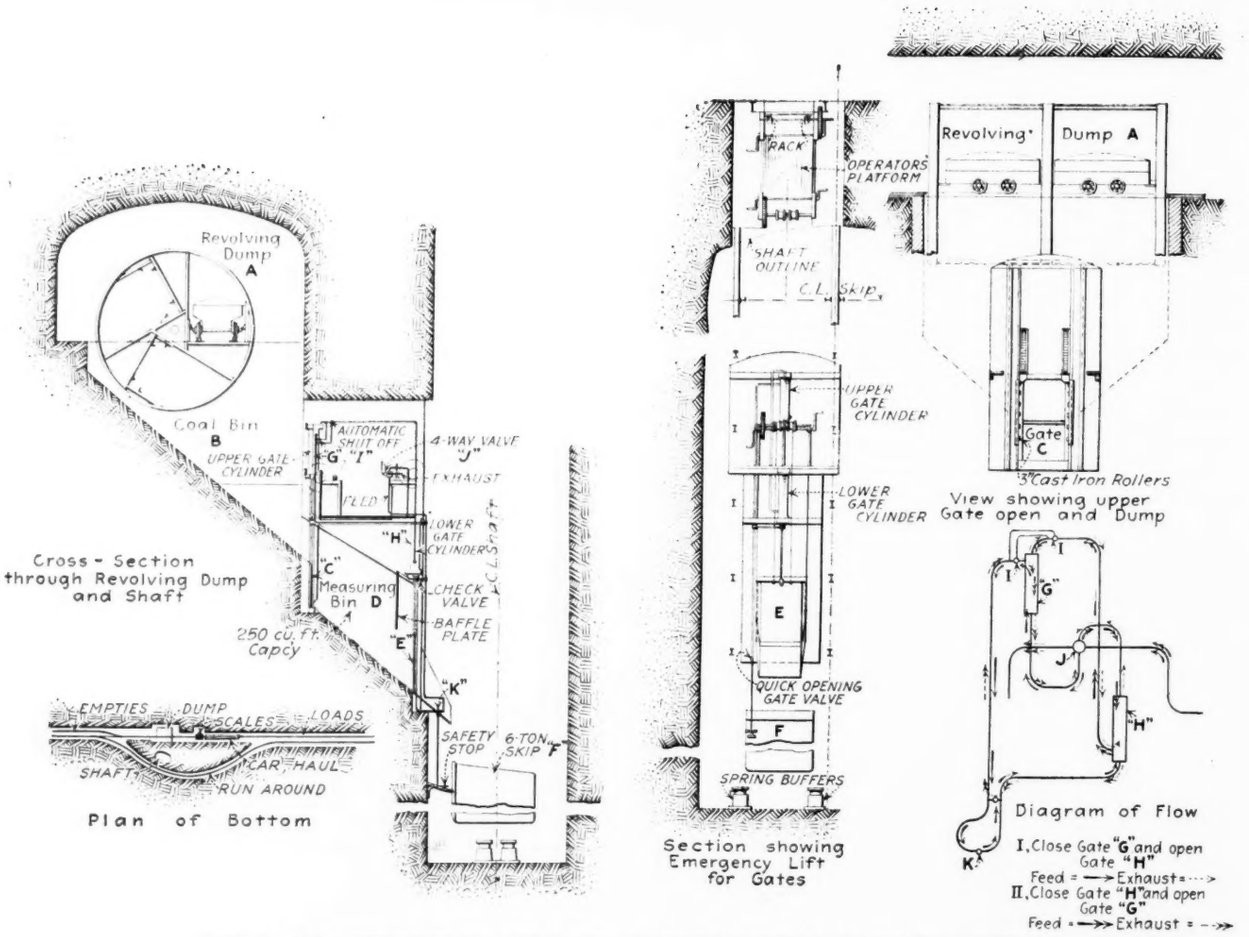


FIG. 2. ARRANGEMENT OF DUMP AND CONTROL DEVICES AT SHAFT BOTTOM

Fig. 1 shows clearly the construction of the dump and method of operation. The operator is shown on the right, his right hand on the lever controlling the operation of the dump, and his left hand on the controller of the car haul motor. Another lever is shown, which is used to operate the car stop for the removal of empty cars when no loads are available. The mechanism for automatically operating the reach rod to the car stop is also clearly shown.

The bin *B*, directly under the revolving dump, has a capacity of approximately 40 tons. To prevent overloading of the skip (6-ton capacity) and spilling of coal around the bottom of the shaft, a measuring bin *D* with a capacity of a skip load (6 tons), is built between the bin *B* and the side of the shaft. This is operated as follows: The skip being loaded and the bin *D* empty, the gate *E* is lowered and the opening closed. The gate *C* is then opened and coal flows into the bin *D*. When the bin is full, the gate *C* is raised to the closed position.

The arrangement of valves and cylinders is such that the undercut gate *C* cannot be operated while the dump gate *E* is open, neither can both gates be open at the same time; further, by means of the control valve at *K*, operated by the skip, the gate *E* cannot be opened until the skip is in position to receive the load. This eliminates any possible error by the operator.

The whole cycle of operation is controlled by four-way valves (marked *J* on the drawing); the operator at this point also controls the movement of skips in the shaft by signals to the hoisting engineer. The diagram of flow shows the course of the water through the cylinders and valves during the operation of opening and closing the gate. Hand-operated emergency lifts are provided in case of temporary failure of the hydraulic mechanism.

Efficient Pipe Covering

Coal means money. This applies just as forcibly to the operator as to the consumer. The old days of extravagance in fuel consumption around the mine are as out of date as the mine mule and the old horse-propelled hoist.

Small isolated steam plants—at the tipples, the hoist, the pumps and other outlying points—are among the most extravagant of fuel wasters. That they can be abolished with satisfactory results is shown by the experience of the Harleigh-Brookwood Coal Co. at Frackville, Pennsylvania.

Here 10 isolated steam installations, each with its own boiler house, involving all the heavy costs of fuel, labor, maintenance and overhead, have all disappeared. In their place one central boiler house supplies all the various operations both above and below ground.

Steam is generated at 175 lb. pressure and transmitted with but small loss from condensation, through a pipe line, extending in all for over 6700 ft., of which 4300 ft. is 10-in. pipe, 800 ft. of 8-in. and the remainder of 6-in. pipe. The greater part of this length is out-

doors, but some 900 ft. is carried underground, to supply triple expansion steam pumps.

The pipe line carries an ample supply of steam for two 20 x 30-in. double cylinder engines, the breaker machinery and all other outlying operations, in addition to the pumps mentioned. A detailed description of this plant was printed in *Coal Age* for Dec. 20, 1913, page 939. (See illustration below, which gives an excellent view of the pipe line at the Harleigh-Brookwood plant.)

All of these pipes are protected by a covering of 85 per cent. magnesia 1½ in. thick, suitably covered and protected from the weather. Over hill and dale, in all sorts of weather, they deliver an ample supply of steam, defying blizzards, storms and zero temperatures, of all of which there are plenty in this section of Penn-

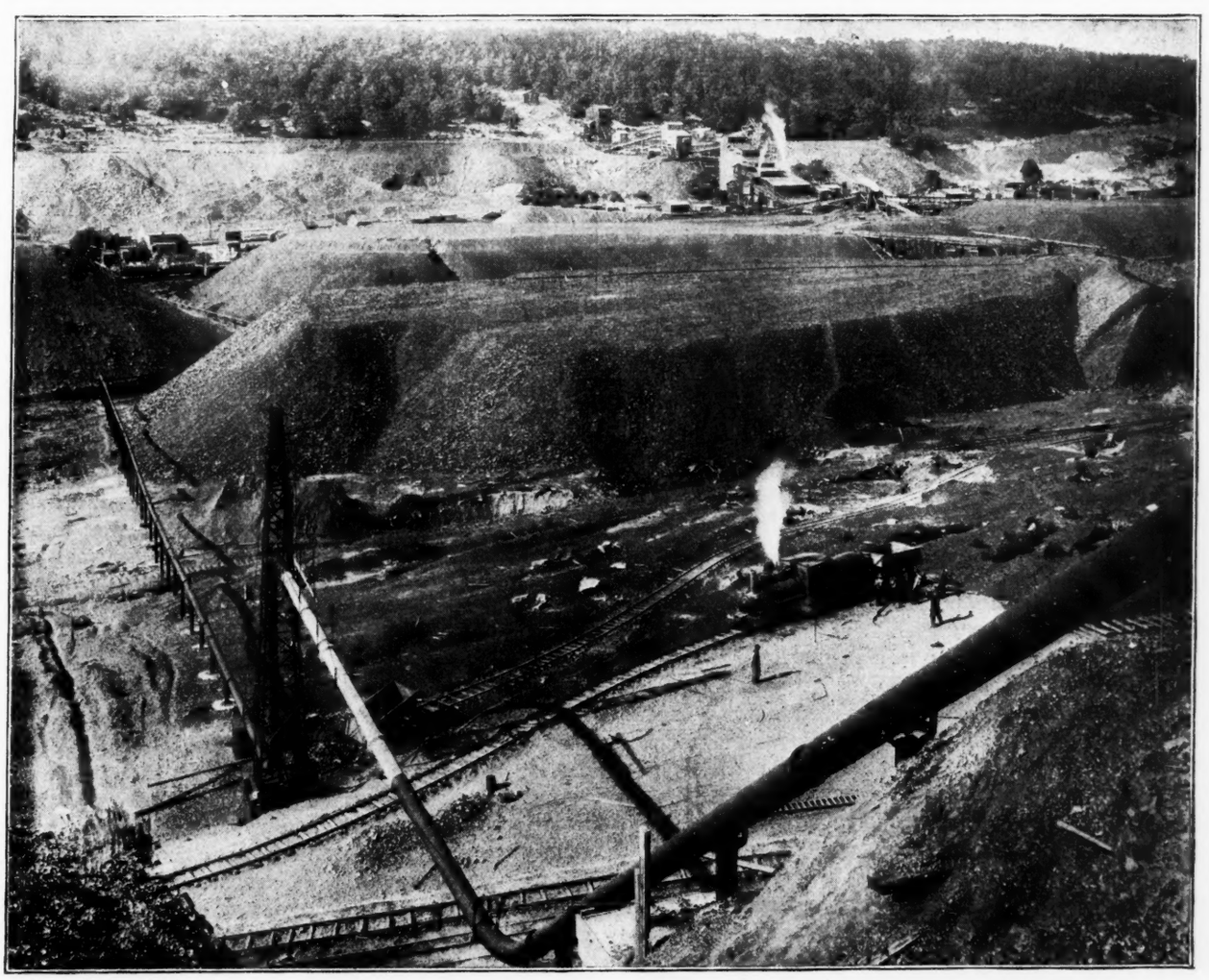
It is of course the heat insulating powers of the covering that make such extreme lengths of pipe line possible. This is by no means an isolated instance. At the Kingston colliery, a few miles away, is a 2700-ft. line, and it is not at all uncommon for much shorter lengths than these to be used.

Thanks to the protection afforded by adequate pipe covering it is no longer necessary to figure on a separate boiler house for each extension of the plant. The first cost of a transmission pipe line, properly insulated, is far below that of even a cheap boiler. The reduction in overhead costs for one year often more than pays for the entire outlay.

There are many instances on record where magnesia coverings have been in service for 25 years and upward without showing the least sign of alteration, either in their structure or in their insulating value. On a cost per year basis it is the insulation that maintains its efficiency over the longest period, that is the cheapest, irrespective of its first cost. The coal saving is the measure of its efficiency. Multiplied by its years of life, this saving often far outweighs all other considerations.

Italy's Coal Mines Are Expanding

In 1917 the coal production of Italy was probably 15,000 to 20,000 tons of coal and 2,000,000 tons of lignite. In 1914 there were 46 active coal mines. This number increased to 59 in 1915 and to 137 in 1916. Evidently the new mines were smaller than the old ones, for in 1914 there were 4000 men employed, in 1915 5461 and in 1916 about 6000 men. Some of the lignite is of the pitch type and may be used as a gas coal, its quality being similar to that of Scotch "splint." This particular lignite comes from Ribolla in the Comune of Roccastrada in the Province of Grosseto, Tuscany. The mines generate gas.



GENERAL VIEW OF PIPE LINE AT HARLEIGH-BROOKWOOD PLANT, FRACKVILLE

Handling Coal and Ashes in the Boiler House

By HENRY J. EDSALL
Philadelphia, Penn.

SYNOPSIS—*The plant here described, although not built at a coal mine, might well serve as a model for such installations. Both coal and ashes are handled by a single conveyor so designed that the chief wear comes upon hardened steel bushings and pins that can be cheaply and quickly renewed when appreciable wear has developed.*

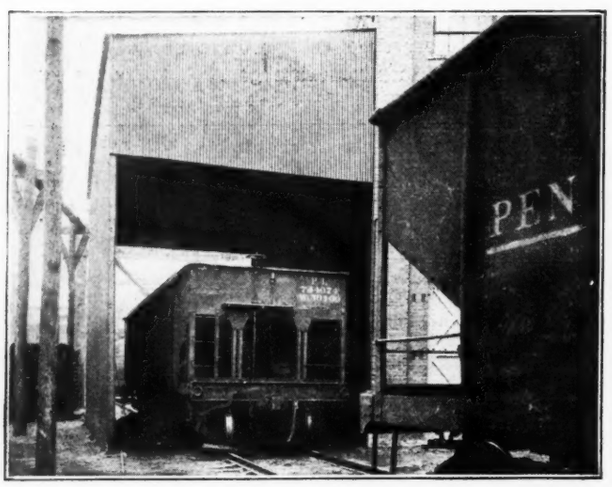
IN THE last three years there have been a great many boiler houses built, and the majority of them have been of moderate capacity varying from 2000 to 10,000 hp. normal rating. As the boiler-room equipment has become pretty well standardized, it has been possible in numerous cases to follow a more or less standard design for the building and the arrangement of the boilers and other equipment.

Since I have been in touch with the design of quite a number of these boiler houses, starting with the first sketches of the plant, I have had a chance to follow the general tendencies in present-day design and to note the attitude of many engineers toward the various types of coal- and ash-handling equipment. There are, of course, certain individuals who are likely to be affected by prejudice or by lack of a sufficiently broad experience; but by considering the attitude of quite a number of engineers, most of whom base their conclusions on actual experience with certain types of equipment, it is possible to judge quite accurately of the general tendencies at the present time.

While the selection of a satisfactory coal-handling equipment is a comparatively simple matter, the handling of the ashes undoubtedly complicates the problem on account of their abrasive nature and their corrosive proclivities when wet. As a matter of fact, however, the difficulties encountered in handling ashes have been largely overcome in the best modern practice, though this fact is overlooked by many engineers and there is still a tendency among some of them to separate the coal- and ash-handling equipment so that the coal can be handled in one system and the ashes in another. This means several machines with several motors and driving arrangements to operate and maintain, and, unless the cost is excessive, these machines will be inferior in design and lasting qualities to a first-class combined system.

At the present time the general tendency is strongly in favor of putting in a single, first-class, pivoted bucket carrier to handle both the coal and ashes. By so doing the simplest possible equipment is obtained along with the least amount of driving machinery and other complications. The best of these carriers have been so carefully perfected and improved, and have given such excellent service with low operating and maintenance costs, that it is fast becoming standard practice to use one of these machines for handling both the coal and ashes in all except the large central stations, where the coal-handling requirements are so great that it is practically a necessity to have separate coal-handling equipment because it is imperative to operate it the greater part of the working day.

The handling of ashes in the same machine as the coal does, of course, somewhat increase the wear. The best modern carriers, however, are built so that this wear is confined to small parts, which are of the best possible wear-resisting materials and which are renewable at small expense. Thus the increase in maintenance cost due to handling the ashes is comparatively small, much less than the increase in the cost of maintenance incurred by adding a separate ash-handling equipment. Furthermore, the use of a first-class carrier reduces the operating costs and the delays to a minimum.



A CAR BEING UNLOADED AND A VIEW OF THE TRACK HOPPER OUTSIDE THE BUILDING

An excellent typical example of a carrier-equipped boiler room, designed according to best modern practice, is the one built a little over a year ago by the John A. Roebling's Sons Co., at Trenton, N. J. This plant, although not built at a coal mine, might well serve as a model for such plants, since the chief difference in design would be in the method of receiving the fuel. This boiler room is designed for six 600-hp., Babcock & Wilcox boilers set in batteries of two and equipped with Wetzel stokers, with short extended furnaces. Each battery of boilers takes up a length of 31 ft. 6 in., and there is a 6-ft. space between each two batteries. The building is about 135 ft. long, and the front part is high enough to accommodate a 1300-ton overhead steel bin of the suspension type, with spouts from its bottom direct to the stoker magazines. At one end of the bin, and also inside the building, there is a 100-ton overhead ash bin with spouts leading out to railroad cars on the siding.

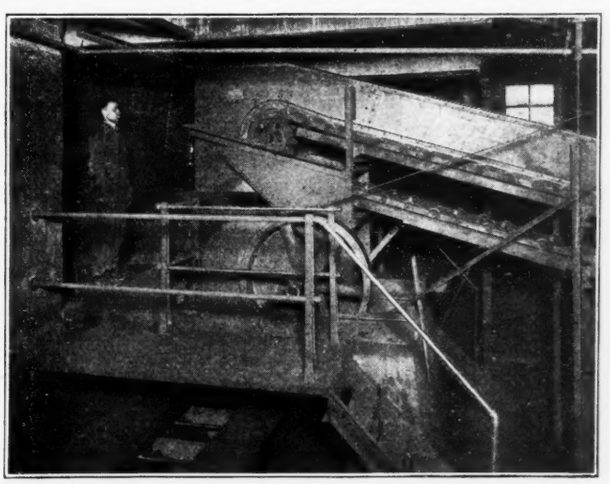
The rear of the boiler room is built with a sloping roof—that is, one of the lean-to type—and is considerably lower than the front of the building. The bin is supported on steel columns set 28 ft. center to center sideways and 19 ft. center to center longitudinally. The bottom of the bin is 22 ft. above the floor; the bin is 18 ft. deep to the top of the girders, and the cross beams which support the conveyor are 12 ft. above this point. Light roof trusses span the columns at a height of 6 ft. 6 in. above the cross beams. This makes the eaves about 68 ft. above the floor level, whereas the eaves at the rear wall of the lean-to are only 31 ft. above the floor level. The total width of the building, center to center of columns, is 50 ft. The walls are brick and the roofs are covered with corrugated iron supported on steel purlins. An ample light supply is obtained by windows at the front and back, also opposite the conveyor on the upper run. There is a ventilator at the upper part of the lean-to roof close to where it joins the higher part of the building.

The railroad track comes in at ground level, which is nearly the same as the boiler-room floor level. This track runs at an angle of about 20 deg. with the side of the building and comes quite close to one corner. The track hopper is located at this corner and, since the siding is a dead-end one with little room for shifting cars, it was especially desirable that the track hopper should be made large enough to make it possible to unload the largest cars without moving them. Since, therefore, the overall dimension from outside to outside of doors for the 140,000-lb. coal cars is about 22 ft., it was decided to make the track hopper 22 ft. long by 12 ft. wide.

The coal- and ash-handling equipment consists of a double reciprocating feeder underneath the track hopper, an apron conveyor extending to the crusher, which is located directly over the carrier. A standard two-roll crusher is employed, and a 24 x 24-in. Peck pivoted bucket carrier, following a rectangular path, having a horizontal center of 131 ft. and a vertical center of 61 ft. This carrier encircles the overhead bin and has the lower run in a tunnel, or basement, below the boiler-room floor so that the ashes can be handled entirely in the basement and raked out directly into the buckets of the carrier. This equipment has a capacity of 60 tons of coal per hour, or an equivalent volume of ashes with the carrier running at the speed of only 45 ft. per minute. There are three electric motors for driving the machinery, a 5-hp. motor for the double reciprocating feeder, a 15-hp. motor for the apron conveyor and crusher, and a 10-hp. motor for the Peck carrier.

The coal is dropped through the bottom doors of the railroad cars into the track hopper, from which it is fed to the apron conveyor by the double reciprocating feeder. The apron conveyor then delivers it to the crusher. After it passes through the crusher, it goes directly into the carrier buckets, which elevate it and distribute it by means of a tripper which tilts the buckets at any desired point along the horizontal run, thereby discharging the contents into the bin. From the bin the coal feeds by gravity through the spouts to the stoker magazines. The ashes are raked out of the ash pits underneath the furnaces and directly into the buckets of the carrier on the lower run. They are elevated and discharged into the ash bin from which they can be delivered to railroad cars by means of gates and spouts.

The equipment in detail is as follows: Each rail of the railroad track is supported across the track hopper pit by means of a 15-in. 73-lb. Bethlehem girder beam. These girder beams are supported on the pit walls at the ends and on a 20-in. 120-lb. Bethlehem girder beam at the center, this cross beam being supported on the pit wall at one end and by means of an 8-in. 32-lb. Bethlehem column at the other end. The double track hopper is made up of $\frac{1}{4}$-in. steel plate, properly braced and stiffened. It has two openings at the bottom. Underneath these openings are the reciprocating feeder plates of $\frac{3}{8}$-in. steel, about 34 in. wide by 6 ft. long each. These plates are connected together and stiffened by means of 4 x 3 x $\frac{5}{16}$ in. angles. They are supported on rollers attached to the feeder sides underneath the hopper openings, these feeder sides being really a part of the track hopper. The reciprocating motion is obtained by means of an eccentric driven by a countershaft running at 25 r.p.m. which is connected to the motor by means of spur gears through an intermediate countershaft. The length of throw of the eccentric is adjustable from $4\frac{1}{2}$ to 6 inches.



APRON FEEDER, CRUSHER AND LOWER RUN OF CARRIER

The apron conveyor is about 30 ft. long center to center of head and foot wheels, with a short horizontal run at the foot and the balance at a slight incline to a

point over the crusher. This apron conveyor is made up of a double strand of 9-in. pitch, steel bushed, steel strap chain with 3½-in. single flanged rollers at the joints. The corrugated steel pans are attached between the chains so as to form a continuous apron 30 in. wide. The chains pass around 18-in. sprocket wheels at the head and foot shafts. The speed of the apron is 54 ft. per minute. The rollers travel on steel angle tracks

UPPER RUN OF CARRIER OVER COAL BUNKERS

on the carrying and return runs. These tracks are supported on angle frames resting on the concrete foundations. The head shaft is driven by means of a chain from one of the roll shafts of the crusher.

The crusher rolls are 28 in. in diameter by 24 in. long and revolve at a speed of 56 r.p.m. The shafts are carried in babbitted cast-iron bearings resting on a cast-iron frame. One pair of the bearings has relief springs, which allow one roll to move back and avoid a breakdown if a foreign substance gets between the rolls. The coal is crushed to a size of about 2 in. and under. The crusher is set on steel beams resting on concrete piers and is driven by means of a belt from the motor to a countershaft, which in turn is geared to one of the roll shafts. The roll shafts are geared together by means of spur gears with special long teeth, to allow for the possible backward and forward movement of one of the rolls. The rubber driving belt is 6 in. wide and runs upon a 44-in. flywheel pulley on the crusher countershaft. This belt drive is an additional safeguard to the crusher in case something other than coal enters the machine.

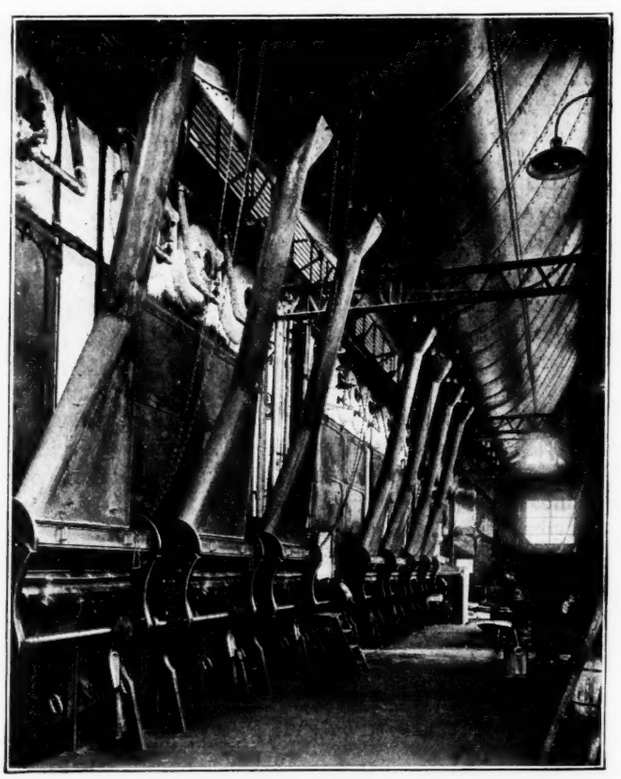
The Peck carrier has two strands of heavy malleable-iron chain of a pitch of 24 in. Between the chains are suspended the 24 x 24-in. malleable-iron buckets cast in one piece with a thickness of metal of about $\frac{3}{16}$ in. and with overlapping lips to prevent the coal and ashes from spilling between them. The buckets are pivoted on cross rods carried by extensions of the inside links and, on account of the pivot points sweeping around the turns in a larger circle than the path of the chain joints, the buckets lap and unlap properly at the turns without the aid of any auxiliary device.

At each chain joint there is a high-carbon steel pin fitted into one pair of links and a case-hardened steel bushing fitted into the other pair of links. Both pin and bushing are keyed into the links, so that the only movement, when the chain bends around the wheels, is between the hard steel surfaces of the pins and bushings. This gives large bearing surfaces of the most excellent materials for resisting wear at the joints. The links are thus relieved of all wear, and the pins and bushings are easily renewable at small expense when they finally become worn.

On the outside of each bushing there is a 6-in. single flanged roller with a hard chilled tread. This is cast with an oil chamber holding, under ordinary operating conditions, about a three weeks' supply of oil. The oil is injected into the roller through a Bennett oiler and filters slowly through a felt washer to the bushing and on through a slot in the bushing to the pin. This arrangement insures a well oiled joint and reduces the friction and wear to a minimum. Also the oil coming from the inside and working out tends to force the dirt out of the joint rather than into it.

The carrier is driven by means of sprocket wheels at the driving turn, the driving shaft being geared by means of equalizing gears to the first countershaft, thus effectually eliminating the irregular motion usually accompanying long pitch chains and securing a uniform motion to the carrier. This countershaft is geared by means of spur gears to a second countershaft, which in turn is driven from the motor by means of a silent chain drive.

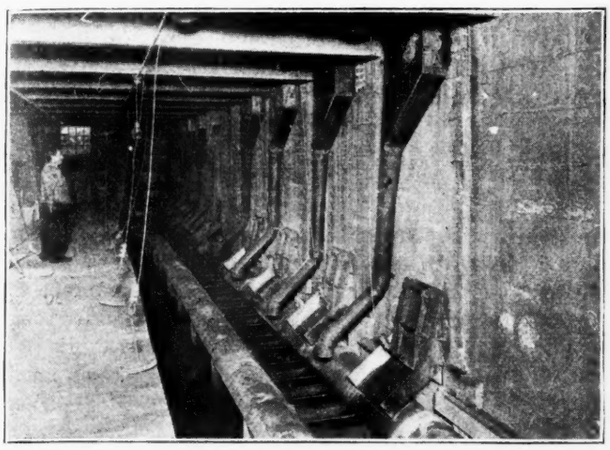
On the horizontal runs the chain rollers travel on regular T-rails supported by cast-iron rail chairs, at-



GENERAL VIEW OF BOILER ROOM

tached to the steel supporting framework on the upper run and to the concrete floor of the tunnel on the lower run. On the ascending and descending runs the chain rollers travel between double T-rails, supported by cast-iron rail chairs, these chairs being attached to the steel casings which inclose both vertical runs.

On the upper run the cast-iron chairs also support the rails on which the discharger travels. This movable discharger is arranged so that it can be moved by the buckets themselves in the direction in which they travel and can be pulled back with a cable which winds upon a drum operated by a hand crank.



LOWER RUN OF CARRIER WHERE ASHES ARE RECEIVED

The carrier chains travel around sprocket wheels at all four corners. The lower turn shafts are supported on cast-iron stands resting directly on the concrete foundations. The upper shafts are supported on the steelwork over the bin and the driving shaft, countershaft and motor are all supported on unit-cast iron stands which keep the shafts in proper alignment and the gears in proper mesh. Where the ashes are fed to the carrier buckets on the lower run there are continuous curved steel guard plates which effectively protect the chains from ashes and deliver them to the center part of the buckets, thereby avoiding spillage.

It can readily be appreciated from the foregoing description that the construction of this type of coal- and ash-handling equipment has been carried to a high degree of efficiency, so that it stands up wonderfully well under the service for which it is designed. With proper oiling and a little general care these machines operate with but few delays and require few repairs, so that the maintenance cost is low and the coal and ashes are handled at a minimum labor expense. Aside from getting the coal out of the cars into the track hopper and feeding the ashes out of the ash pits, the operation is entirely automatic. The feeding of the ashes to a carrier is also a much easier and more rapid operation than it is with various other systems. This part of the work is thus less laborious.

Cause of "High Mica"

BY F. W. BLACKWELL

Most people seem to think that high mica is due to the mica insulation getting loose and working out between the commutator bars. This may be true in some cases, but in most instances high mica is caused by the soft copper commutator bars being worn down, allowing the mica to extend up beyond them. The obvious correction for high mica is a returning of the commutator. "Undercutting" will prevent the frequent occurrence of high mica troubles.

New Electric Air Heaters

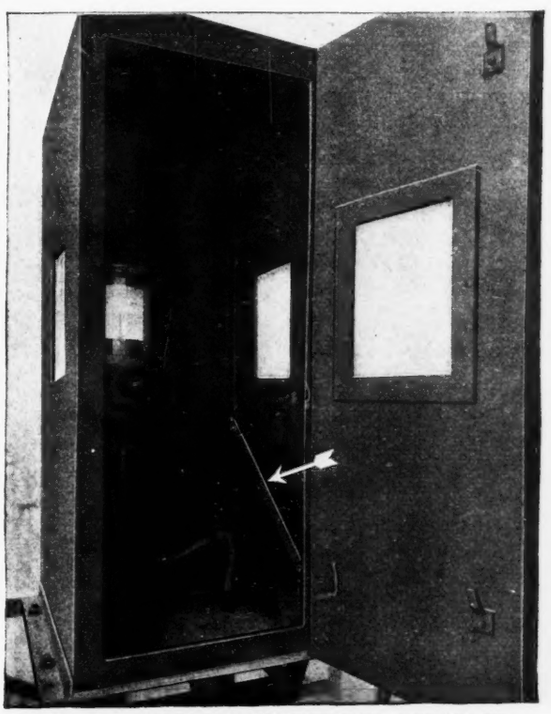
The recent coal shortage caused industrial men not only to use their available supplies of coal primarily for power production, but to look at the same time for supplements for use in heating.

The Cutler-Hammer Manufacturing Co., of Milwaukee, Wis., foreseeing this tendency, developed and is now marketing a new and improved line of electric air heaters designed to supplement the furnace or steam-heating system in the home, office, store, factory, shop or industrial plant.

Electric air heaters are found useful in heating crane cabs, outhouses, valve, pump and meter houses, exposed remote corners or rooms, watch or signal towers, theater ticket booths as well as for many miscellaneous applications. In such uses they effect a distinct saving in coal. Flexible electrical conductors will carry heat cheaply and efficiently to remote points.

The new electric air heaters are self-contained, easily moved from one point to another and possess the inherent advantages of all electrical heating devices: namely, heat under perfect control and absolute freedom from dust, ashes, soot, unpleasant odors and vitiation of the air. The perfect control possible allows efficient use of the heat; as soon as a location is warmed, a turn of the switch cuts off the current and the heater can be moved to warm another part.

Users find the new electric air heaters convenient supplements to their existing heating systems. In some central stations and other great industrial establishments maintaining large generating plants and delivering current at a cost not exceeding 1 or 2c. per kw.-hr., it has been found economical and convenient to use electric heaters entirely. These new heaters are made in various shapes, sizes and capacities and a heater to fit almost any space or condition of mounting may be selected.



HOW ELECTRIC AIR HEATER IS INSTALLED

New Price Regulations

New prices, effective Apr. 5, have been fixed by the Fuel Administration as follows:

Kentucky—Harlan, Perry and Letcher Counties and operations in Pike County on the Levisa Fork of the Big Sandy River: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95. East of the 85th degree of longitude, except Harlan, Perry and Letcher Counties and operations in Pike County on the Levisa Fork of the Big Sandy River: Run-of-mine, $2.65; prepared sizes, $2.90; slack or screenings, $2.40.

Tennessee—All except Overton and Fentress Counties: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95.

Virginia—Lee, Wise and Dickinson Counties; Russell County west of Finney on the Norfolk & Western Ry.: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95.

Iowa—Marion County: Run-of-mine, $2.70; prepared sizes, $2.95; slack or screenings, $2.45.

Georgia—Run-of-mine, $3.25; prepared sizes, $3.50; slack or screenings, $3.20. The Georgia field covers a limited area and was not included in former prices regulating the coal industry.

Wyoming—(Sub-bituminous.): Egg run, $2.15; nut run, $2.

Weekly Coal Production

For the week ended Mar. 30 bituminous coal production was 10,832,000 tons. Anthracite forwardings were 43,642 cars. Beehive coke production totaled 622,000 tons. Byproduct coke production amounted to 474,610 tons. The figures used are those compiled by C. E. Lesher, of the United States Geological Survey.

A decline in the production during the week ended Mar. 30, along with the knowledge that a still further decrease took place during the week ended Apr. 6, is regarded seriously by authorities on coal in Washington. Those factors which have been limiting production during the winter now are much less potent. The new factor entering into the situation is the uncertainty as to the price the Government is going to pay for fuel for its railroads and ships. With the taking over of the railroads, the Government takes a large percentage of the entire coal production of the country.

With the uncertainty as to the price which the Government will pay, each mining district in the country has properties which have suspended operation pending an adjustment. The situation, however, is much more serious in the West, where "no market" is a serious limiting factor. During the latter half of March, the Western mines lost one-fourth of their working time due to this fact. The railroads are not making purchases and it seems to be difficult to get the public started in the purchase of its next winter's supply.

To Conserve Domestic Sizes of Anthracite

Domestic sizes of anthracite coal are not to be used for industrial purposes where it is to replace bituminous coal. An order to this effect has been sent by the Fuel Administration to the state administrators. The order follows the discovery that domestic sizes of anthracite are being used at times for steaming purposes. Such procedure the Fuel Administration defines as absolutely unfair to the domestic consumers. Each community will receive only its allotted tonnage. Use of anthracite by factories simply will make it impossible for the domestic demand to be met. Five per cent. has been added to the basic price of coke manufactured east of the Mississippi River and sold west of the Rocky Mountains. The order reads as follows:

"That in all cases of sale of coke, manufactured east of the 94th meridian, to consumers located west of the 115th meridian, where the seller assumes the responsibility for the quality and delivery of such coke, and extends credit to and carries the account of the purchaser in accordance with the usual trade practices, there may be added 5 per cent. to the established price of coke f.o.b. cars at the point of manufacture."

More District Representatives Appointed

D. F. Hurd has been appointed district representative of the Fuel Administration at Cleveland. He succeeds J. B. Zerbe, who resigned because of ill health. The district, which will be under Mr. Hurd's direction, embraces the coal fields of eastern and central Ohio and the Panhandle counties of West Virginia.

Julian B. Huff has been appointed a district representative with headquarters at Greensburg, Penn. With the exception of those on the Sewickley branch, he will have charge of the mines of the Pennsylvania R.R. north of Ruffsdale in Westmoreland County.

W. L. Byers, with headquarters at Uniontown, Penn., has been named district representative in charge of the mines in Westmoreland County on the Pennsylvania south of Ruffsdale, and of the operations on the Sewick-

ley branch of that road. In addition, he will have jurisdiction over operations in Fayette County south and west of a line from Banning through Whitsett junction to Brownsville, with the exception of the mines on the Baltimore & Ohio at and east of and connecting at Indian Creek. His jurisdiction will extend along the Baltimore & Ohio in Westmoreland County and on the Mount Pleasant branch of that road. His district, however, does not include the mines on the Baltimore & Ohio along the Youghiogheny River or river mines on the Youghiogheny River.

Charles M. Means Heads Inspection Division of Fuel Administration

To enforce its clean coal order and other regulations, a large number of inspectors soon are to be appointed by the Fuel Administration. Charles M. Means, a mining engineer of Pittsburgh, who is known nationally, has been made manager of the inspection division of the Fuel Administration. To start with, one inspector is to be named in each district representative's territory. As the work becomes more thoroughly organized other inspectors will be appointed as may be found necessary.

Railroad Fuel Question May Disrupt Fuel Administration's Plans

Overtopping interest in any other coal matter last week was the railroad fuel question. Loath to give up their former practice, the railroads are insisting on obtaining their fuel at much lower prices than those specified in the official schedule. While the Fuel Administration is insisting that coal should be furnished all consumers, whether large or small, at the same price, railroad officials do not accept this view and apparently have won over Director General McAdoo to their way of thinking.

At the Fuel Administration, the generally held opinion is that domestic and industrial consumers have paid a portion of the railroads' fuel bill long enough. While in the past, conditions may have been such that it would be difficult to prevent the railroads from securing coal at cost or below, now that the United States Government is running the railroads it is contended that no such advantage should be taken of a considerable portion of the public. This policy, however, is not being followed by the railroads, who, in numerous instances, have refused to supply cars to mines until prices satisfactory to them have been quoted for railroad fuel. That the United States should be a party to any such questionable methods is a cause of great surprise. If it is persisted in, the demoralization of the whole coal scheme—the consummation of the whole effort of the Fuel Administration—is threatened. The condition precipitated by the railroad fuel matter will have the same effect on the situation this year as did Secretary Baker's letter last year. The effects, however, will be more immediate, since the railroad fuel matter has such a direct bearing on the labor situation.

Social life is one thing; business is another. True friendships may count in business, but it is a mistake to think that cheap, social popularity is a business asset. Sterling integrity, progressiveness, reliability, service and quality goods all count as nothing else can.

Brief Washington Notes

Coal lands in the Nenana field of Alaska and in the Fort Peck Indian reservation in Montana have been reserved by Presidential order.

Five per cent. more coal was mined in February, 1918, than in the corresponding month of 1917. The poor showing in January, however, still holds the production for the first two months of 1918 a full 3,000,000 tons under the production the first two months of 1917. The calculation on which the figures are based was made by C. E. Lesher of the Geological Survey.

All operators in central Pennsylvania who have collected five mills per ton for the proposed fund to meet the expense of a pooling arrangement have been instructed to refund such collections. A plan which was under consideration for the facilitation of distribution has been rejected by the Fuel Administration.

A suit to test the constitutionality of a raid by the Department of Justice at the request of the Fuel Administration has been instituted in the Supreme Court of the District of Columbia by the Cambria and Eastern Coal Co. The offices of the coal company in Washington were raided Mar. 1 by agents of the Department of Justice who seized papers and other matter in the offices in an attempt to secure evidence to prove that the coal company had violated the Fuel Administration's price rulings.

To the FIREMAN
The Man With The Shovel controls the wise use of Coal. The Country needs his skill to prevent waste of fuel required to keep us warm and to turn the wheels of industry that shall command Victory.
DEPARTMENT OF THE INTERIOR
Franklin K. Lane, Secretary
BUREAU OF MINES
Van H. Manning, Director

EDITORIALS

Nearing a Crisis

JOHN SKELTON WILLIAMS, financial man for Mr. McAdoo, and at present in charge of fuel purchases for the railroads, has flatly refused the right of the Fuel Administration to fix prices and establish conditions under which railroad coal shall be bought. Mr. Williams maintains that the railroads are privileged to purchase coal where they please and at the best price they can force the operators to accept. In making such contracts for fuel, the railroads propose to continue to use their control of car supply as an effective weapon to force price concessions.

Fuel Administrator Garfield is determined that the railroads shall not be exempted from the operation of fuel regulations. He points out that to permit such a practice would be to sanction the establishment of a Government policy of great injustice. A few mines and a few miners will prosper at the expense of the remaining two-thirds of the industry. Mines producing commercial coal and working only a part of the time will necessarily have to shut down, or get more money for their product. Therefore, in the final outcome the public is obliged to pay all that the railroads save.

It is wholly unlikely that the President will sanction a plan that is sure to stir up serious labor unrest through its inequitable operation. He cannot indorse action that permits one Government department to deliberately violate the rulings of another Government administration. He cannot fail to see that if nearly one-third of the total bituminous production is exempted from Government restrictions, outlined by the Fuel Administrator, the remaining tonnage cannot be distributed in an efficient and satisfactory manner.

The railroads are a vital link in our industrial life; they must have a full supply of coal, of the quality best suited for their purposes. This can all be accomplished in an orderly manner and in strict conformity with carefully established plans of procedure. It is far more necessary that the Nation as a whole shall be provided with an adequate supply of coal in the present world crisis than that John Skelton Williams, or any other Government official, shall gain a reputation for efficient railroad management through increasing the net revenue of our transportation systems, and thus proving the benefits of Government ownership.

Steel Breakers and Washeries

THE late Eckley B. Coxe in the '90's attracted the attention of mining men—particularly anthracite coal operators—to his experimental iron breaker at Drifton, Penn. During the next few years Coxe Bros. & Co. built another iron breaker at its Oneida colliery. Unfortunately this latter breaker was soon destroyed by fire. As one of the strong arguments for iron construction was immunity from fire with consequent decrease in insurance rates, the new policy was viewed as an experiment requiring further demonstration as to its practicability.

However, the new scheme remained latent only awaiting favorable circumstances to spring into life. Such conditions came about gradually. There was a growing tendency to introduce cast-iron columns and iron beams in breaker frames. Finally the Lehigh Valley Coal Co. built its Buck Mountain breaker in 1911 almost entirely of structural steel. During the succeeding years this type of construction received such an impetus that at present there are 18 steel breakers and washeries in the anthracite coal region—built, under construction or being designed. The leading article in this issue of *Coal Age* is a discussion of this whole matter.

The design, fabrication and erection of steel breakers require special knowledge and experience. The multiplicity of sheaves, belts, shakers, jigs, chutes and conveyors tends to make the designer's task a most complicated one. The stresses are so involved and difficult to determine, that to secure a well-balanced structure requires the judgment attained from experience to a greater extent than in practically any other type of structural steel work—provided economy in metal is a consideration. From a coöperation standpoint, it is especially important to have the design, fabrication and erection handled by one organization, thus tending to obviate the mass of misunderstandings and contentions, with their unavoidable delays, which frequently attend operations where different branches are handled separately.

The advantages which steel possesses for breaker construction are pronounced and definite. From the operator's point of view, perhaps speed of construction stands out preëminent, neglecting advantages accruing to the use of a modern building material. A steel breaker can be tapped out in less than one-half the time it would take to build a wooden structure. Again, slow depreciation, smallness of members, progress of construction in rough and freezing weather all speak volumes in favor of steel.

Citing a few instances of rapid construction we turn to the Markle breaker. This structure was completely designed, fabricated and erected in 88 days, including an unavoidable delay of 20 days in the erection work. This was in response to a hurry call on the part of the coal operator to replace a wooden breaker suddenly wiped out by fire. The Buck Run breaker at Minersville, Penn., was designed, fabricated and erected in 68 days. But a record of special significance is that of the recent Alliance breaker of the Lehigh Coal and Navigation Co. Throughout a period unprecedented in the history of the steel business, the work on this breaker has gone ahead notwithstanding workless days, railroad embargoes, government restrictions including changes in rollings, shortage of labor, etc. Further, at the site of the Alliance building during erection there was experi-

enced the most severe winter "within the memory of the oldest inhabitant." In addition there was inaccessible location, treacherous ground on which to operate locomotive cranes, also a number of minor occurrences—all of which delayed erection at least four weeks. The contractors expect to complete this job in 103 or 104 days. Their contract time was 100 days. Formerly a wooden breaker of any size was a six-month proposition.

A unique feature which has been taken advantage of by several operators in the case of working over old culm piles is that of the bolted washery. Structures of this kind set up with all field connections bolted can be operated for a time at one bank and then be taken down and reset on another site. This scheme is being used in erecting the Markle No. 4 washery, at Jeddo, Penn., at the present time. The Thorne-Neale washery near Ashland, Penn., was similarly handled last year, being set up complete in eight working days.

The question of moving a washery to another bank or of transporting a bank to the washery, is a problem involving a nice balancing of factors affecting its solution. It suggests the case of Mohammed and the mountain. Will it be a better policy to move the bank to the washery with the necessity of a steam shovel to load the bank into cars which have to be hauled to the washery—coal freezing en route possibly on the long hauls in severe winter weather? Or will a saving be effected by moving the washery to a new bank with attendant expenses of railroad tracks for shipping the washery product, a water supply for cleaning and sizing the coal, and power to run the plant?

A final word as to speed construction. Commenting on this feature, a successful steel breaker builder notes, "Service of this kind more than offsets the increased cost of steel construction."

Peace Without Victory

SOME time in the clash of 1914 when the Teutonic troops had not committed all their many crimes and when the truth about those they had committed could still be questioned because the crimes had not been investigated or when we could still explain them away as the outcome of a drunken orgy, some time when we did not know all that we know now, if the Germans had been willing, they could have had peace without victory.

Today there could not be peace without victory without an indictment of the peacemakers. When a city has a terrible crime committed in its midst and fails to punish the perpetrators that city is shamed. The world is but a big city. Over a million murders of Armenian, Belgian, British, French, Arab, Serb, Russian and American civilians have been committed, not in the prosecution of war but out of a sheer lust for slaughter. Cathedrals and property of all kinds have been destroyed in the hope that the burden of the war might perdure till long after the war was ended.

Unless we, the citizens of the world, punish these acts we discredit the government under which we live. We proclaim that we give way to force and violence and are not determined on justice and right. Let us proclaim peace without victory when we have government without jails. The crimes of the Germans and their allied nations must be expiated by defeat. They may not like the sound of the word, but nations and parts of nations just as sensitive and far, far more honorable have had to suffer it. Into the valley of humiliation the destroyers of civilization must pass, or civilization will itself be destroyed.

Let us not be squeamish. There are people in America who say it would be wicked to shut out, or put a heavy duty on German goods, yet we have for years been trying to arrange special concessions to those nations which shut out our goods, making no concessions at all to those who gave us free entry into their ports. The sin we are urged to avoid is only the crime of treating Germany as we would have treated Great Britain before the war could we have arranged reciprocity with the other European powers. Perhaps we shall do unrestricted business with Germany after the war, but if we decided not to do it no one could utter any complaint. The fear is not that we will be too severe in our actions to Germany, but that we shall be guilty of coddling the unrighteous, of compounding with Germany's villainy, of acting as "accessory after the act" by protecting Germany from the majesty of offended law. Violence, murder, theft and war must be proved unprofitable. The business of the soldier must be proved to be disgraceful to all those who do not use it in the interests of peace and justice. The profession of arms for glory, aggrandizement and pelf must be made as dishonorable as the business of burglary. This can only be attained by a peace with victory. Till it arrives let us go on buying Liberty Bonds as fast as they are offered.

Two Culm-Bank "Iniquities"

A FEW years ago the public when visiting the anthracite region very piously regretted the large piles of waste coal known as culm banks and urged that something be done—just what, the public did not say—to recover the values in those mountains of fuel.

Just of late the operators have been preparing fuel from culm banks and the public is beginning to suggest that there is something morally wrong in making use of the rejects of past operations and of obtaining, as it were, something for nothing. The public is in a querulous mood. It has discovered two iniquities, to store culm and to use it.

Because a piece of coal has lain for years by a piece of slate is no reason why the two should not be separated

and the coal placed on the market no matter what bad company the coal kept for many years it should not be spurned, so long as it appears alone at the consumer's cellar. It is no more to be condemned than meat which has grown near the bone if the bone is cut out before delivery at the consumer's larder.

The trouble is, however, that the public has grown leary because too often the culm of past days has been shipped indiscriminately or only partly cleaned. A sample which has recently come into our hands is apparently the culm from a most efficiently conducted modern washery. The slate above the Pittsburgh or Freeport coal would, from a cursory inspection of the culm, seem to promise a higher thermal value. This "fuel" was sold as "culm," it is true, but it was a scandal to waste even the time of the shoveler over the handling of such rubbish.

Happy Mean in Cleaning Coal

IT IS a bad time to decry the consumer for being over particular about clean coal, for he is sore about the treatment he has recently received and with good reason. In too many cases the operator has taken advantage of the coal shortage and shipped him coal far below the standards of former years.

But the consumer, so recently beridden by certain unscrupulous operators, has been in his time the beggar on horseback, and he has ridden the coal operator to death. Edwin Ludlow, vice president of the Lehigh Coal and Navigation Co., told the American Institute of Mining Engineers about a firm that demanded coal having 14,600 B.t.u. per pound. Yet that firm was only evaporating 9 lb. of water per pound of fuel whereas about 11 lb. should have been secured.

Consumers have caused many a ton of passable fuel to be thrown away in order to get an excessively high fuel value. Some mining concerns, it is true, could fill the bill without loss, but others only met it by a waste of fuel. When the war is over we shall probably drop back into the old ways of coal testing, and the operator with coal of lower thermal power will continue as in the past by a finical preparation to make up for defects in the coal he is mining. If he crushes and burns under his boiler the material thus thrown out no loss will result, but if the fuel rejected is used for railroad ballast and highroad surfacing the loss will be considerable.

Team-Track Mines Less Numerous

REDUCTIONS in the price of coal have caused a high mortality rate among such wagon mines as supply coal for rail haulage—"team-track mines" as they are termed. The ending of contracts by regular expiry, by zoning restrictions, and possibly also later by a general order is the last blow. Is it unfair to say that the industry hopes it will prove sufficient to end the existence of these team-track mines?

They destroy the efficient operation of both railroads and collieries. The railroads find their side tracks cumbered by cars placed for the team-track loaders. They find the time of loading is much greater and more uncertain than when the coal is loaded direct from a railroad tipple.

The team-track mine takes men who otherwise would work more productively in large and more efficient operations, which are now short of men. But the chief count against the team-track mine after all, is that it does not take all its men from the big mines. Some it takes from farming work, which is far more grievously undermanned than mining. The closing of the team-track mines will release a number of farmers for their proper work.

Today, or till recently, many farmers and farm laborers were digging coal and hauling it. When conditions are readjusted they and their teams will be employed in raising food. When winter comes they may, to advantage, go back to mining and hauling coal, not, however, for rail transportation, but to supply local needs. Such wagon mines have existed for years. They work mainly when no farm work is possible and they deliver coal when it can be sledded and when, in consequence, the expense of delivery is at a minimum. They give the farm hand an extra two or three months of congenial work.

These winter mines are always welcome. Under the Fuel Administration's regulations there is no likelihood that it will be found impossible to operate them. They will continue to supply the farmers with fuel for domestic consumption and for lime burning and help to save the wood lots on which the future operation of coal mines so much depends.

They will, by supplying winter work to the farmers help to lower the overhead cost of the production of farm products. Moreover, the lessening in number of the inefficient team-track mines will assure to the larger coal operator a supply of props in the winter without which his mines cannot be safely conducted, for the farmer who cannot haul coal will make and haul props.

The team-track mine decays! May its activities draw rapidly to an end! The farmers should not go to the mines. The tide of labor should rather flow the other way. Idle miners should be encouraged to plant gardens and work on the farms whenever nothing else can be done. Many of the best men around the mines were farmers in earlier days, here or in some foreign land. They are more adaptable to the needs of the farm than are professional men, boy scouts, and city school children, who have been suggested as possible agricultural laborers, but who at best could do little but hoe and who could not hope to be strong and skillful enough to do a man's work at that.

Concentration, mixing, temperature and time of contact are interrelated and each of these factors is essential for good combustion. Consideration of these four factors indicates the conditions necessary to obtain good results. These conditions are: (1) Enough air; (2) air and the combustible gases thoroughly mixed; (3) a furnace temperature above the ignition point of the gases; (4) enough time for combustion to be complete. In practice an excess of air is required, but the amount of excess air can be small if the mixing is thorough. Mixing is probably the most important single factor and the one most frequently responsible for poor combustion. A large excess of air and high temperature will do no good unless the air is mixed with the furnace gases and the oxygen and combustible gas brought into contact.—*Bureau of Mines Bulletin No. 135.*

Shall the Civilization of the Ages
vanish before
the Devilization of the Hun?
One hundred million freemen answer
NO—

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The best news of the week is that the Central Pennsylvania mine workers decided on Apr. 5 to leave the wage question with the Fuel Administration, asking that body to investigate wage conditions and appoint mine workers on the investigating committee. The Fuel Administration declared that it had already made a most careful investigation and had satisfied itself that the price of coal set by the Administration was such as the wage justified and indeed made necessary. The matter is therefore settled.

John P. White on Saturday, Apr. 6, declared that the mine workers were satisfied. They had a stormy meeting, it is true, and condemned their leaders liberally, but after their steam was all blown off they realized that the price fixing was in competent hands and was based on the wages paid and on the other expenses incurred by the operators. Some time ago the operators in Central Pennsylvania, in common with other operators, had two decreases in price, one at the suggestion of Francis S. Peabody and the other on the demand of the Fuel Administration.

The mine workers did not suffer by these price revisions even though they were downward. The operators, however, suffered severely from the last cut. By increasing the price of the coal produced in central Pennsylvania the Fuel Administration now proposes to do justice and nothing more, but the mine workers do not see it that way. They declare that the advances in wage for which they are asking can be paid by the operator. If that could be proved Dr. Garfield, we may feel sure, would not raise wages but restore the old price or one somewhat lower than the one he has just set.

CENTRAL PENNSYLVANIA SPECIALLY FAVORED

There is no call for a revision of wage in central Pennsylvania. The mine workers have fared a trifle better than other regions as to wage increases and as to wage rates and they have gained also the abolition of pushing. What, after the war, will happen to the miners in the areas containing only thin beds is a matter of grave question. These areas of thin coal are in overwhelming majority. Perhaps such beds can be worked after the war despite the handicap of the pushing provision, and all the brushing it entails. But it is certain that they could not be worked if a wage differential against the district, such as the mine workers are asking, were added to the difficulties created by the necessity for brushing.

Let it here be said that to the higher officials of the union belongs all the credit for the patriotic resolution of the delegates. These officials threw all expediency to the winds and jeopardized their standing with their followers by a patriotism so sincere that it did not permit them to seek their private advantage. There are few men in public or journalistic life who could not take a lesson from these fearless fellows who were minded to tell the truth no matter what it cost. Accustomed to seek the suffrages of the men it required no small exhibit of backbone to get up and set themselves directly athwart the current of the convention.

Leading credit must be given John P. White, who though a member of the Fuel Administration, is in the pay of the miners and is so poor that he needs their financial support. He would probably have to resign his position were the support withdrawn. It was he that reminded them that the Illinois operators were getting a 45c. decrease and that on Apr. 1 the Montana and Wyoming operators got a decrease of 70c. per ton. If the price of coal were to determine wages, the mine workers in those states would get decreased pay, but no such reduction is proposed.

He told the men that when the miners make $5 a day and cannot pay house rent it is not because the wages are inadequate, but because the running time of the mines is too slow. He said that in some districts the men get only 6 and 8 days work a month.

But even after Mr. White's speech the convention voted 138 to 15 in favor of the policy of the special committee, which committee urged that the 60c. increase in price be shared or rather all given to the mine worker and that the mine workers be given place on the Federal wage investigation committee by which some such recommendation was to be made. U. E. Swartzentruver, the secretary of the policy committee, however, declared against a strike. Charles T. O'Neill, the district vice-president, also said he was an American first and therefore opposed to any

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cessation of coal production. George Bassett added "There is not a man in this house who would not lay track or drive mule for six months and live on bread and water, if doing so will whip the Kaiser."

One delegate named Brown struck a discordant note. He called on the delegates to fight as hard and as long for $1.20 a ton coal "as the men in the trenches are doing."

Another recent event of interest was the lynching of a baker whose only proved offense was that he desired to continue work in an Illinois coal mine. The detais are given in another article in this department. There seems to have been inadequate evidence against the man, so that there was not even evident guilt to excuse the action.

But it is easy to criticise the action of the miners unjustly. It must be understood that there has been a panic fear that a mine explosion, or mine explosions, would be successfully started by some miscreant, and this fear was not without ample excuse.

At the Shoal Creek mine near Panama, Ill., 25 sticks of dynamite were found in an airshaft, and it is believed that only the failure of a percussion cap prevented an explosion. Then again in the Prairie mine two kegs of powder were exploded about half a mile from the bottom of the shaft. A fuse about 20 ft. long was found in the entry and a stone had been placed on the kegs. There was clearly a

conspiracy. Fortunately the coal dust of the mine did not aid the explosion, and the results were far feebler than its perpetrators expected. But it is quite possible that at some time just what the miners fear may happen.

Lynching is wrong and must be ended. It frequently is directed against innocent men. It is peculiarly American. Perhaps we have reason to be proud of the fact even though lynchings are far too numerous, are participated in by people who should know better and are rarely punished. Where other countries have a massacre, a pogrom, a vespers or mob violence on a large scale, we usually specialize on one man who really may be guilty. We in general require a certain semblance of guilt. We almost never destroy all those who happen to part their hair, grow their beards, or write their names in the same way as the real criminal. We never destroy a race for the shortcomings of some one of its members.

But the mine workers must never forget that action like that at Collinsville, Ill., is quite likely to result in reprisals in Germany. As that country has no citizens of America who are above all suspicion of virulent pro-Germanism it is quite possible that reprisals would be taken on our soldiers.

The growth of patriotism in the main leaders in the union has been so marked that it is surprising to find that "Mother Jones" has not come under the influence. On Labor Day that agitator with Congressman M. M. Neely spoke at Moundsville, W. Va. The Congressman advised the miners to load every empty as soon as it arrived and argued against any dissatisfaction here till after the war, contending that any trouble which arose "over here" was infinitesimal as compared with what would result if the United States were not on the winning side "over there." But Mother Jones, after making a strong plea for patriotism, contended that all the fighting should not be done "over there." She announced that she was going to Charleston and would in the immediate future make her headquarters in the unorganized fields of West Virginia.

A strike at the mines of the Pittsburg Coal Mining Co., of Pittsburg, Okla., which commenced September, 1916, has not yet been settled and it is announced that all negotiations are ended and the strike will continue indefinitely. The miners demand more pay for the removal of rock.

Lynching of a Miner by Miners

A man, R. P. Prager, who according to his own account had worked in the mine for four years mostly as a timberman, but who had been more usually employed as baker, was lynched by a mob of 350 miners at Collinsville, Ill., in the early hours of April 5. He appears to have been innocent, but the rumors of the corner saloon loafers about him may be repeated to explain the cruelty with which he was treated.

It was said that when he was working at the Donk Brothers Coal and Coke Co. mines at Maryville quantities of powder were stolen during a period of weeks. The miners accused Prager of stealing this powder and alleged that his purpose was to blow up the Maryville mine. Prager endeavored to join Local Union No. 1802 at Maryville, but the president of the local, by name J. Fornaro, apparently opposed his admission. It was said that he was a Socialist and had made disloyal remarks at a meeting, but the evidence is that the only thing wrong with Prager was that he was a German and the feeling against him appears to have been spread by some of the leaders of the local union for their private purposes. His letter to his parents shows he spoke in broken English with German idiom, and in this way exposed himself to suspicion.

On Apr. 3 he was paraded through the Maryville streets as a German spy. He vehemently denied, however, that there was any element of disloyalty in his behavior. Escaping, he remained in hiding until he came to Collinsville on the night of Apr. 4. Arriving at Collinsville, he went to his room. The men in a nearby saloon saw him and, gathering a mob, went to his quarters and ordered him out.

The police rescued Prager and took him to jail, but the mob broke in and found him hidden under some material in the basement. They led him through the town, barefoot, and made him sing patriotic songs. He requested to write a letter to his parents and by the glare of an auto lamp and with a mud guard of another auto as a desk he wrote a short note beginning, "I must on this the 4th day of April, 1918, die." His tormentors finally hung him to a tree.

Prager was registered in St. Louis as an enemy alien. It is said that he tried last summer to enlist in the United States Navy. According to his statement he had declared his intention to become a citizen and was expecting to apply for full citizenship. Walter Clark, the superintendent of the Maryville mine, declares that he believes Prager was "all right" and says he is convinced that Prager did not steal powder. Local authorities have started an investigation and it is to be hoped that inquiry will result in conviction. The whole section needs cleaning up. Maryville is not far from East St. Louis, a town where local ruffians and some miners recently killed several negroes.

Would Import Mexicans Into Texas

The coal operators in the Eagle Pass, Tex., section desire the Federal Fuel Administration to give them permission to import coal miners from Mexico on the same basis and under the same conditions as agricultural workers are now being admitted. The lack of Mexican labor to operate the coal mines has caused many operators to shut down their mines, and the output of coal is now very limited.

L. M. Lamar, vice president and general manager of the Olmos Coal Co., has been delegated to take the matter up with the Federal Fuel Administration in an effort to get a modification of its rulings as to the admission of Mexican coal miners. In his letter to the Fuel Administration Mr. Lamar says:

"It may be true that there are idle mines and coal miners in certain parts of the United States at this time, due to the severe weather, crippled transportation service, etc., but there are few, if any, coal operators or other well-informed persons who will state that we have a surplus of coal miners anywhere in the country. Quite the contrary is the case. Even so, the idle miners of the North will not come to and work in this section, as the climate and other conditions are not attractive to them.

"We are absolutely and exclusively dependent on the Mexican miner, and the same state of affairs applies to all other lines of industry based on manual labor, such as farming, construction, etc. There is practically no other labor here in the unskilled line. The industries must either utilize Mexicans, and get more of them, or the work will be left undone. Unless we are permitted to secure Mexican coal miners at Eagle Pass our output cannot be increased. This will mean that coal must be hauled, in some cases (for the San Antonio cantonments, for instance) from other points of production, involving sometimes about five times the amount of transportation service and loss of time to equipments."

The scarcity of Mexican labor in the United States is due to the fact that when conscription was established the Mexicans in Texas got the idea that they were to be drafted into the military service. They thought, or were told by evil influences, they were to be given preference as to conscription—that is, taken first, and placed in the front of all battle lines. "This absurd idea is amusing to all who know better," says Mr. Lamar, "but the ignorant took it in earnest, and thousands, including our coal diggers, stampeded back to Mexico."

Now, these Mexicans want to come back to the United States. They are starving over in Mexico, but are unable to return because of the strict immigration laws, which require a head tax of $8 and bar all illiterate ones. It is to enable farm laborers to come to the United States that the immigration laws were modified, but this does not apply to coal miners. These Mexicans left the United States last summer and fall with all their belongings, flattering promises being held out to them. Since then, it has been learned, most of their cattle starved to death. It is estimated that at least 10,000 Mexicans have left Texas.

Engineers Discuss Labor Problem—II

The closing remarks of Walter Douglas of the Phelps-Dodge Corporation before the New York Section of the American Institute of Mining Engineers had reference to the company store and hospital, on the defects or alleged defects of which the labor agitators had laid much stress. He showed that the company's store reduces the cost of living and that only recently 90 per cent. of the employees at Ray, Miami and Globe had petitioned the company to establish company stores at those places.

He felt that the hospital is a different problem and that if the company does not run it, it will not be run right, and the men will not receive adequate attention. The charge for this service is nominal and yet the agitators always find much fault with both the company's store and the hospital in spite of the fact that both institutions are for the good of the employees.

Socialistic Trend of British Thought

J. Parke Channing, consulting mining engineer, said that while the United States had been efficient as far as methods are concerned it had not been efficient in the utilization of its man power. He cited the change which has taken place in England since the beginning of the war, and showed that it had become a socialistic community which was highly efficient with the government doing almost everything. He said that the English laborers were not going to be content to return to the old order of things.

He admitted that the problem in Great Britain was simpler than in the United States on account of the fact that practically all of England's laborers are English, while the United States has a mixture of unassimilated foreigners. He felt that if we are to carry the war to a successful conclusion and increase our efficiency after the war we must Americanize our foreigners and give them our own point of view.

He outlined the proposed program of the British labor party which has four principles, namely, 1. The universal enforcement of the national mimimum. 2. The democratic control of industry. 3. The revolution in national finance. 4. The use of surplus wealth for the common good.

If these four demands are carried out, England will be a socialistic state, and Mr. Channing did not presume to say how much this program could or should be carried out, but cited it as showing the trend of thought in England. He said that the British workman has seen his wages increase and that he was more than ever convinced that in the past he had not been getting his fair share of the products of his toil. He also believed that the workman was realizing that he had not done his proper share toward increasing the wealth of the country.

State Socialism Successful in Britain

Generally speaking, Mr. Channing thought that the workman had seen such good results obtain in the democratic control of industry that there was no reason why this control should not be just as efficient after the war. Mr. Channing distinguished between the English labor party and the Bolsheviki of Russia, saying that the former did not believe that the working class should manage the country. The English laborer realized the importance of brains and education and the necessity of these things in bringing the country to the highest state of development.

He felt that a similar program was likely to come up in the United States and that we should be on our guard lest the pendulum swing too far if the employing class does not give more attention to the laborer and see that his condition is improved. He felt that engineers were the best instruments for carrying out the necessary work. He spoke of the growing tendency to give engineering students some training in human engineering and cited such courses at Columbia University.

In discussing trade unionism he said that Professor Hoxie's work on trade unionism in the United States would clarify anyone's ideas of that subject and he advised all engineers to study the book carefully. He urged that laborers be educated to a proper point of view rather than coerced into any line of action. He spoke favorably of the human engineering work of the industrial department of the Young Men's Christian Association.

Edwin Ludlow, vice president of the Lehigh Coal and Navigation Co., agreed with Mr. Schwab that "labor is now in the saddle." He said that the time had come when we must have captains of labor as well as captains of industry, and that both these factors must get together if industry is to be developed to its utmost possibilities.

He reviewed conditions in the anthracite fields of Pennsylvania, beginning with the strikes some years ago which were settled by Mr. Roosevelt, and he said that the most important feature of the method of settling disputes was the establishment of a board of conciliation, the final arbiter in all disagreements. He added that pending the adjudication of disagreements, there should be no suspension of work, either by lockout or strike, and the agreement between the mine workers and operators called for this provision. Mr. Ludlow thought that we made a mistake if we did not encourage the better class of men into the union so that those organizations would be directed by the best thought among the laborers.

Psycopathy to Cure Disease of Discontent

A physician who is one of the directors of the Psychopathic Hospital of Boston spoke of the possible use of the psychologist in handling labor for large organizations. He felt that there was a good field already developed for this type of scientist. Such men could assist large concerns to get the right men for the right jobs and could analyze many conditions which were purely psychological in their character.

R. J. Young, of the Illinois Steel Co., explained the elaborate care the organization has taken toward the establishment of harmonious relations between the workers and the company. He laid much stress on the value of an employment manager whose function it was to secure a desirable labor supply. He advocated the ownership of industrial stock by employees and suggested that when a certain percentage of the stock was so owned these stockholders should have representation on the board of directors of the company.

Pensions Based on Employee's Ethical Value

With regard to pensions he raised the question as to whether the amount paid should be based on the wages of the man or on his ethical value to the company. He thought that basing a pension solely on the wages previously earned was not a fair basis for pension. Mr. Young then outlined very briefly the numerous activities engaged in by the steel corporation in an effort to create good working conditions and establish harmonious relations between the company and the men.

Among these efforts were medical supervision, dental clinics, shop sanitation, industrial canteen, domestic science instruction for the laborers' wives, proper illumination of shops and homes, fire prevention, proper ventilation, recreation for the workmen and their families, education for the children, housing and insurance. He laid considerable stress on the value of picking proper individuals for foremen because he said that they represent the management to the men and hold very important positions in the organization.

He felt that they were the closest point of contact and as an organization increased in size it grew more and more important to pick the right sort of foremen. After a man is placed in a foreman's position he should be constantly educated and trained in the duties of the place and in the importance of his job, and Mr. Young felt that the necessity of this training would come to be realized to such an extent that there would be established in this country an institute of human engineering to which these foremen could go from time to time.

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DISCUSSION BY READERS

Success in Mine Management

Letter No. 1—Since the recent discussion of the efficiency of mine foremen and firebosses, in *Coal Age*, I have been asked repeatedly to express an opinion in regard to what constitutes a thoroughly reliable and successful mine manager. I am not referring, now, to the use of that term made in Illinois to indicate the foreman of a mine, but am considering the man who fills the office of manager for the company.

In my opinion, the manager of a mine must have a clear and exact understanding and knowledge of what work can be done and how it can be executed most economically, and the time required for its performance. To secure this knowledge, I do not believe that it is necessary for a manager to have dug coal, driven a mule, set timber, or performed other work required in a mine. He should, however, have so closely observed the performance of this work by others as to be able to discriminate between men who are efficient workers and those who employ unpractical and costly methods.

An important feature or characteristic of a successful manager is the ability to provide the men and material that are most useful for his purposes, with the ultimate aim of reducing the cost of production. This will require, on his part, a broad knowledge of the industry in all its branches, from the digging of coal to its transportation, loading and shipment to market where it must meet the competition of other coals.

In addition to his practical knowledge of mining operations, the success of a manager depends just as largely on his consideration of the welfare of all the men employed by the company. He must consider these men and their families as having human necessities and provide for them suitable houses surrounded by all that makes life useful and enjoyable, such as schools, churches and means of recreation and entertainment.

ULTIMATE TEST OF A MAN'S ABILITY

The ability of a manager is often severely tested when an accident occurs in a mine and the lives of the men underground are endangered by reason of an explosion or fire in the mine, or an inrush of gas or water into the workings. His ability to quickly grasp the situation and provide the necessary means of rescue and other needed help is an unquestioned indication that he possess important elements of a successful manager. Indeed, the ability of a man to organize and direct the work of rescue when the emergency suddenly arises is a true index of equal ability to successfully manage the daily affairs of the company who employes him.

In my talk with young men, I have always tried to impress on them the importance of combining a knowledge of theory with the practical experience they are gaining, from day to day, by the work they perform in the mine. I have urged that such a knowledge will some day gain for them a higher position in the company and, perhaps, will find them seated, eventually, behind the manager's desk, occupying his chair and performing the important duties of that office.

Young men are much harder to train than young animals. A little dog can be taught to perform certain tricks, because he is willing to obey and recognizes his master; but this is not the case with the average young man. The giving of instructions successfully, involves the willingness and desire to learn on the part of the one taught. I believe this is the common experience of many of our older mine officials who have endeavored to teach the young men growing up around them and must, in time, assume their duties and perform their work.

R. W. LIGHTBURN.

West Leisenring, Penn.

American citizens should buy LIBERTY BONDS, *because they will give the Government the means to bring the war to an early close, and to put an end to suffering and slaughter.*

Success in Superintending

Letter No. 1—Not everyone engaged in the coal-mining industry will agree with me that the position of mine superintendent is the most important position in the company. It is my belief, however, that such is the case. It is a position that requires a man of ability, tact and diplomacy, and one who is capable of dealing fairly and squarely with everyone and showing no favoritism or preference.

The superintendent of a large mine, like the foreman of a smaller operation, is the real link between the men and the corporation who employs them. He stands before the men as the representative of the company, and his actions, unconsciously it may be, are responsible for the likes and dislikes that form and grow in their minds.

In previous discussions, it has been argued that the official who is able to gain the confidence of his men is fostering in them a spirit of loyalty to the company and their interests. In doing this, he is gradually but successfully paving the way for the earnest and hearty coöperation of every worker in and about the mines. This, in my opinion, is one of the chief characteristics of a successful superintendent, but it is a feature that requires large self-control and a thorough knowledge of human nature, together with a careful study of every individual workman in his employ.

The successful superintendent who has gained his position through hard work and continuous application is in a position to appreciate the viewpoint of his men. He understands their way of thinking and is able to form a good judgment of their opinion regarding the various questions that are constantly arising in the daily operation of the mine.

Such a man's previous experience in the ranks enables him, now, to understand better the difficulties that con-

front him in his official capacity. The same experience will dictate to him tactful methods of dealing with his men; and, as a result, he is generally able to effect a just compromise. To the company, the services of such a man are invaluable.

Contrast, for a moment, the man I have just described with one whose rise from the ranks has given him an exaggerated idea of his own importance and a desire to use his authority in ways that are overbearing and unfair. The company that employs him comes to realize when it is too late the untold and almost irreparable damage such a one has been able to do by virtue of his position.

Not only should the superintendent be willing to listen to both sides of a controversy and decide impartially, but having reached a decision, he should be capable of impressing his view of the situation on others in a manner that is just and fair to both parties. His knowledge and insight into human nature should make him willing to allow for human weaknesses to a certain extent, and to exercise patience and forbearance while, at the same time, enforcing obedience.

The successful operation of a mine is dependent on the amount of work done by the men employed, and no one will deny that a satisfied worker will do more and better work than one who is dissatisfied. For this reason, a superintendent who commands the respect and confidence of his men will be able to show more material progress than one who deals unfairly and rules by reason of the authority of his position.

Golden, Colo. FRED L. SERVISS.

I'm buying LIBERTY BONDS *because buying them is the first, last and only duty of every American at this time.*

Climbing

Letter No. 2—Reading a letter on this subject by "Kappa," *Coal Age*, Jan. 26, p. 209, followed by the brief note on "Getting Ahead," Mar. 9, p. 459, set some thoughts running in my head to the effect that the principal reason why men fail to *get ahead* is their habit of *holding back*.

The man who begins to think that he is giving more work than the worth of his daily wage is at the point of proving that he is drawing more money than he is worth. No one ever heaped the measure of his performance while his eye was constantly on the clock. Truculent self-interest invariably defeats itself.

The surest way to advancement is the promotion of the boss' welfare. Minute-counting employees create penny-weighing employers. Where there is a stingy worker there will soon be a stingier boss. A man's mind cannot brood and breed at the same time. Where there is discontent there is little action, and a worker that is not satisfied with his lot will not be satisfying to his employer. No! *One never gets ahead by holding back.*

Granted, for sake of argument, that there are merchants and manufacturers whose dollar-vision is obstructed by their dime-voracity; and many concerns that fail to see per cent. in profits, because they look too close and too long at cents in expenditures. Such institutions are failures in the making. Large purposes and great undertakings are not evolved from contracted policies. A mean man performs no courageous acts, and, as must be expected, falls short of his possibilities. In trade and industry, risks and gains are inseparable bedfellows.

The man who wears the thorny crown of success has come into its possession because of his persistent courage. Finding one's self in the wrong sort of organization calls for increased effort to secure recognition by the exercise of greater willingness and efficiency. In serving a responsibility one but serves himself. A half-hearted service not only reduces an employer's profits, but likewise the future prospects of the delinquent worker.

PERSISTENT EFFORT WINS RECOGNITION

Self-deception is folly, and stifled faculties eventually become dwarfed and unresponsive. Keep in trim; strive for *the man within* and your record will attract *the man without*, because competence in a worker does not pass unnoticed. Competitors in the world's trade know everyone who is contributing to a rival's strength. Practice to be steady, willing, earnest and eager to serve, in the little corner where you are, and some keen judge of human values will before long pay market price for your merits.

The man who limits his endeavors to the things he is specifically appointed to do; displays no interest in matters outside his immediate duties; arrives on the hour and quits on the stroke of the gong; figures the minimum equivalent for present salary, caring nought for what happens about the mine as long as it does not bear directly on his own activities—that man is stunting his own growth. He hurts no one so much as he injures himself. But the one who delivers the goods, raises his average, while he who insists on sticking close to his own base, merely caring for what comes his way, will end the race where he began. It is the willing spirit and the active mind that climb. G. W. CARLSON.

Logansport, Penn.

I'm buying LIBERTY BONDS *because a Liberty Loan button with a gray head above it is a full service uniform.*

The Key to Success

Letter No. 1—One seldom reads the story of the promotion of a friend, or the rise of one who has attained success by extraordinary efforts, without being strongly impressed with a desire to unravel the mystery and discover, if possible, what was the key to the man's success. Many such instances were brought out in the discussion that occurred some time since in *Coal Age*, entitled "Merit vs. Favoritism."

It is not my intention to discuss that particular phase of the subject but only to add a few words that will suggest to the thoughtful man what is the true key that will unlock the door of fortune.

Speaking of the promotion of men to the position of mine foremen, I believe that it is true that favoritism is often shown in making the promotion. However, it is my belief that few men who have been thus favored continue to hold their positions for any length

of time, unless their promotion has stimulated them to unusual activity.

It is only natural that those who invest their capital in an undertaking should demand results, and *results* can only be secured through the efficiency of the workmen employed. These are true business principles and require that the man who is to succeed in the end must be one who is willing to make the necessary effort for his own advancement. The man who is looking for promotion must be willing to forego the pleasures that would otherwise absorb his time and consume his idle moments, and devote himself to study and improvement. Looking at successful men, one realizes that they are what their efforts have made them, and this conclusion develops in a man a determination to set himself to the task of securing like succcess.

In our state of West Virginia, candidates for the position of mine foreman must hold a certificate of competency granted them by an examining board, after they have successfully passed the required examination. While most men appear anxious to obtain a position as mine foreman, few are willing to devote themselves to the task of preparing to take the examination. When told that they must spend some of their evenings and idle hours in study, they appear to lose their interest. For such there is little hope of advancement.

A Lost Opportunity

One instance that I recall is that of a mine foreman who held only a second-class certificate. His superintendent, anticipating his own promotion, urged the foreman to prepare himself and take the examination for a first-class certificate, which would put him in line for promotion to a superintendency. Although he promised to help the foreman in the work of preparation, the latter gave no heed to the suggestion. As a result, a new man was brought in and appointed superintendent to fill the vacancy.

Had the foreman, in this case, tried and failed he would be worthy of our sympathy and future success would still be within his grasp, but the failure of the man to try excites only one's contempt. I am convinced if there were more men who were willing to try for higher positions, there would be more promotions from the rank and file of the laboring classes.

Let me not be understood as saying that passing the examination gives assurance that a man is competent to take the position of mine foreman. He must have experience to go with his technical knowledge. Neither is the man who has spent several years digging coal at the face fitted for the position of mine foreman. He must have experience in the working, drainage and ventilation of mines, and possess the ability to handle men and economize in all matters of time and material.

This does not mean that a man, to make a good foreman, must be a technical graduate who has acquired most of his knowledge from textbooks; but the successful mine foreman must possess a knowledge of the theory and principles of mining, in addition to his practical experience in the operation of mines.

In closing, let me say again that the true key to success is the willingness of men to prepare themselves for advancement. Let us put aside all ideas of "favoritism" and base our hopes of success on the efficiency of our own efforts, and, above all, let us remember that he who builds his own fortune on the wreck of another's prospects will not long survive.

Bluefield, W. Va. D. H. Perdue.

I'm buying Liberty Bonds *because I don't want to hang my head in shame every time I meet a man in his country's uniform.*

The Handling of Men

Letter No. 7—I have been particularly interested in the several letters regarding the successful handling of men, and would like to add a word on this topic myself. To be able to deal successfully with a body of men and secure results that are at once satisfactory to them and to their employers is, in my opinion, one of the most important requisites of a mine foreman. I would add, though he possess all the other qualifications required to fit one for that office and lack the patience, tact and initiative necessary to secure the desired results, he would prove a failure in the end.

A foreman in charge of men must be able to judge correctly in regard to their individual qualities. Otherwise, he will make many mistakes by placing men in positions that they are not fitted to fill, or giving them work that they are ill-adapted to perform. By way of explanation, let me say a man who is a model miner may be wholly incapable of driving a mule or running a locomotive. A good mule driver may make a poor man to operate a machine for cutting coal.

Something more than willingness in the worker is necessary for the proper performance of different kinds of work. Some men are natural miners; others natural mechanics; while still others have skill in the handling of a horse or mule. It is these characteristics in men that adapt them to different classes of work, and the mine foreman must be able to determine by his observation and by questioning to what class a man belongs.

Need to Study Human Nature

Besides these physical qualities possessed by men, there are the human elements that go to give individuals different dispositions, and it is important for the mine foreman to discover the nature of each man he employs. Some men will respond with their best efforts to a kind word; others are won by flattery or praise; many require to be encouraged; while still others must be compelled by the use of rough language or severe measures. The foreman must be all things to all men. He must, of course, provide the proper material and tools for doing the work, or he cannot expect the best results.

When instructing a new man how the work must be performed, a foreman's patience is frequently severely tried. A workman will often do the opposite from what he has been told, not because he means to be contrary but through his lack of understanding the instructions given him. It is up to the foreman, then, to explain himself, so that the man will understand fully what is expected of him.

As an arbitrator, the foreman is often obliged to settle differences between his men, and sometimes even family troubles are brought to him to be adjusted. It

is in the settlement of such disputes that the foreman often shows his greatest tact.

The successful handling of men requires, moreover, initiative on the part of the man in charge. He must be able to do the right thing at the right time, and not be under the necessity of consulting the man above him. He is the one in charge of the work and should be capable of its proper performance. He should be held responsible for the results, and if these are not forthcoming, he must expect to give place to another man who is better fitted for the position

PRIDE IN PERFORMANCE OF WORK

An important element in any operation is that the man in charge and the men under him must have a love for the work, and display an interest in its performance. Not only must the foreman take pride in the manner in which the work is performed, but he must have the ability to make every man feel the same pride. In this way only can the men be brought to feel that they are a real part of the business. Every worker should feel it his duty to do his part to establish a reputation for the place. The reputation of the company is as much to every worker as the wages he receives, since these will ultimately depend on the success of the business.

Finally, in addition to his other requisites, the foreman must have the welfare of his men at heart. His treatment of them must be such as to make all feel that their efforts are appreciated. At the same time, his discipline must be such that every worker will know what is expected of him. Disobedience of orders or violation of mining laws, mine rules and regulations cannot be tolerated. In this way only will the men come to have respect for the foreman, which is essential in securing the highest efficiency in the work. A lax discipline is sure to breed trouble. In the handling of men, the old adage is true "Take care of the little things and the larger things will take care of themselves."

J. H. TIPTON.

Hooversville, Penn.

I'm buying LIBERTY BONDS *because my negro elevator boy has bought one out of his $10 weekly wages and I don't want to feel ashamed in his presence.*

Mining Equipment

Letter No. 2—I have been a much interested reader of the letter signed "Progressive," which appeared in *Coal Age*, Mar. 9, p. 468, regarding the securing of accurate information in respect to the performance of mining equipment in actual use.

The writer has drawn attention to conditions that would cause many operators to hesitate in regard to giving publicity to the results they had obtained in the use of different types of equipment. Most of us will agree with "Progressive," however, that the coal mine operator who has used certain equipment in the operation of his mine is the one who could, if he would, give the most valuable information in respect to its performance.

Assuming, for example, a certain type of coal-cutting machine or haulage locomotive has been in use for three or four years in a mine, working under certain conditions, with the result that the records show a considerable saving since the installation was made, there can be little doubt that to spread that information broadcast would be of great assistance to the coal-mining industry and would be welcomed by all coal operators. The suggestion is made that such publicity might "take an unfair advantage of advertisers, by making comparisons of similar equipment under widely varying conditions," which might not appear or be comprehended by the writers.

It would seem, however, that the real difficulty in the way of disclosing information in regard to the performance of certain equipment, by operators using the same, is the fear of giving valuable information to competitors. At the present time, I fear that comparatively few operators will be found willing to voice their opinions relative to the results obtained in the use of various equipment installed by them at considerable expense. It is therefore necessary for the manufacturers to advertise the performance of their own equipment, which is done through the advertising columns of journals or by mailing descriptive catalogs and circulars direct to consumers. It is true, as "Progressive" has intimated, that mine operators often feel they are "fed up" with such information coming from the man who has the equipment to sell and they would welcome information from users of the same.

In closing, let me express the hope that a new era is already dawning and that mine operators will soon take a broader view of the situation and recognize the value of the information they can give in respect to the actual practical performance of mining equipment to the coal industry at large of which they are a part. The general adoption of this policy will in the end bring its reward to every operator.

——, Ala. "CHECKER."

Letter No. 3—Speaking of mining equipment and the results obtained in its use, there is one feature regarding the treatment of the steel used in construction that cannot fail to be of far-reaching importance and interest to all coal operators. I refer to the heat treatment of steel, particularly the steel used in mine-car axles and haulage locomotives.

Some eight or ten years ago a few railroads in this country began experimenting with heat-treated axles of various kinds, and they also had some of their engine truck frames undergo the same treatment, as well as the crosshead guides of their locomotives. The result was that when the material so treated had been in service for a considerable time, it proved so far superior to the steel formerly used, that few of the roads now, I understand, would permit any vital part of their locomotives to escape this treatment. I believe that the success achieved in the use of heat-treated steel, in railroad practice, can be largely attributed to the hearty coöperation of many members of the Master Car Builders Association.

In this connection, let me suggest that there are a number of associations connected with the coal-mining industry; but, to my knowledge, none of them have given any serious consideration to the necessity of the heat treatment of mine-car and locomotive axles. This is a matter that does not as vitally concern the mine-car builders as it does the users of such equip-

ment. If my information is correct, however, there are a large number of heat-treated axles now in use in the anthracite region and the same can be said with regard to alloy steels of various kinds, such as chrome steel, vanadium steel and many others.

It is important to say, here, what many already know, that the tensile strength of a heat-treated axle, or even an axle of alloy steel, is seldom, if ever, less than 1½ times the tensile strength of the ordinary hot-rolled steel so largely used in the manufacture of much mining equipment. Indeed, the tensile strength of the former will often reach three and four tims that of the latter.

I understand, further, that a low-carbon steel is quite generally used in the manufacture of mine-car axles, the carbon in the steel often being as low as 0.1 per cent., the steel being hot-rolled. This quality of steel was used by a large coal company during a long period, until they were advised of a better axle steel, which they have since used with increased satisfaction.

Quality of Steel in Mine-Car Axles

To my mind there is nothing more important in connection with a mine car than the quality of the steel in its axles. An inferior quality of steel will cause the axle to bend easily, and the metal will often crystallize under the repeated vibrations incident to its use. The crystallizing of the steel will cause an axle to break suddenly and, perhaps, cause a serious wreck on the haulage road and tie up the mine until it can be cleared. The result, in such a case, is not only the damage done to the cars and the expense of clearing away the wreck and making the necessary repairs, but of even greater importance is the loss occasioned by the temporary shutting down of the mine.

Since *Coal Age* is regarded as the national organ of the coal-mining industry, at the present time, the discussion of this subject in its columns will prove of untold interest to coal operators, especially those who are thinking of bettering their equipment. I, with others, will welcome a recital of the experiences of operators in respect to the quality of steel they are using in their mine-car and locomotive axles. It may be possible, also, to show specimens of microphotographs of the right kind of heat-treated axles, together with microphotographs of inferior axles, as this would enable many to understand the technical use of these terms in a more thorough manner. P. K. Howard.

New York City.

Each of us should buy Liberty Bonds *to assume at least part of the individual responsibility which the war imposes on the nation as a whole.*

The Mine Gatehouse

Letter No. 3—In reading the letter of W. H. Noone, *Coal Age*, Feb. 2, p. 256, explaining the advantages of the mine gatehouse, I was reminded of the time when I started the same system in an Alberta mine of which I had charge as superintendent and mine manager. The system worked well and is still in use, after 14 years, having undergone little change.

A large board was prepared, about 30 in. wide and 5 or 6 ft. long. The board was ruled with lines and holes ¾ in. in diameter were drilled at regular distances apart on these lines. Each hole was numbered, besides being marked with the name of the miner and his working place. If the man had no contract number, his name and place only appeared on the board. These names were put in a separate section by themselves. Drivers, motormen, timbermen, etc., were kept in their respective divisions underneath the others.

Operation of Checking System

The practical operation of the system was quite simple. A man called the "checker" was in charge of the board and placed a small wooden peg in the proper hole as each man, on passing the window of the checking office, called out his number or name. The checker became so expert in putting the pegs in the holes that the men were able to pass the window in a steady stream and be registered correctly. At times, the checker would use both hands and place the pegs in their proper holes with almost the same dexterity as a typewriter would handle the keys of her machine. When the men returned from the mine they would again pass the window and check out, the checker removing the pegs from the board as the numbers were called.

In the use of this system we scarcely ever had any trouble at the end of a period. Each man's time was made up from the board. The checker was stationed in the office, or "gatehouse" as it has been called, and if a man quit early the time when he came out of the mine was marked on the timebook correctly. Not only did the adoption of this system save much expense in keeping the time of the men working in the mine, but it enabled the mine manager to see at a glance what men were at work in the morning and to fill the places of those who had not come to work.

Plan to Insure Uiform Output of Coal

It was our custom, in that mine, to keep 10 or 12 men who were called "open-link miners." These men had no regular working places, but were sent to rooms where a man's buddy had failed to come to work. The rule at this mine was that no man was permitted to work alone, an extra man being sent to his place when his partner was not on hand. This plan had a good effect in maintaining the output of the mine more uniformly than would otherwise be possible.

Comparing this system with those I have observed in mines in Washington, Montana, Colorado and Kentucky, where brass checks were used and these were put on the board when the miners went into the mine and taken off again at night, I am convinced that it is of great advantage to have a competent man in charge of the checking board, whose duty it will be to mark the time that each man works, correctly.

This also serves to keep men in their places for the entire day, unless they have a good excuse for quitting, as the checker is obliged to note the cause of each man who comes out of the mine early. When the men realize that there is a close watch kept on their coming and going, it has a marked effect on keeping them in their working places until the end of the shift.

Moreover, as has been pointed out, a good checking board when properly kept is of great value in showing who is in the mine, in case an accident should occur that would make this information of importance.

Cassidy, B. C., Canada. Agar.

INQUIRIES OF GENERAL INTEREST

Sinking Shaft Through Quicksand

I have been much interested, recently, in the study of the problem of sinking a shaft through quicksand; and am anxious to secure what information I can in regard to methods that have been used successfully in sinking shafts through such strata. I have heard of some shafts being given up, because of the inability of the sinkers to control the inflow of water and sand struck at varying depths below the surface.

In one instance, a shaft had reached a depth of 80 ft. when it penetrated a 4-ft. bed of quicksand. Continued bailing and pumping produced no effect and the shaft was finally abandoned, because of the sinking of the surface over a considerable area surrounding the excavation. I would like to ask whether it would have been possible to save this shaft by any practicable means.

Although I have had little practical experience in sinking through quicksand, my study of the problem has suggested a method that appeals to me as bidding fair to be successful. It has the advantage of being more simple than any arrangement of steel shoes and tubbing, which are generally recommended when sinking through such measures.

Without attempting to give my own ideas, I would like to ask one or two questions: Does quicksand rise above its own level in a shaft? Is it possible to control the inflow of quicksand into a shaft excavation by the use of cement grouting, and how should this be accomplished?

JOHN A. RURY.

ercy, Ill.

Some sections of the Illinois coal field are famous for the extensive beds of quicksand, representing old river bottoms and lying anywhere from 25 to 50 yd. below the present surface. Much difficulty was experienced, a few years ago, in sinking the Ladd shaft, in Illinois. At that time, the writer devised a plan that proved successful in penetrating a thick bed of quicksand lying at a depth of 150 ft. below the surface.

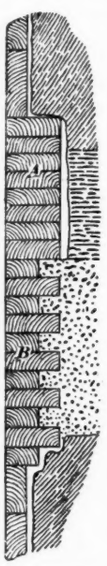
As shown in the accompanying figure, which is a cross-section through the curbing, the shaft was timbered with alternate 10- and 12-in. planks laid flatwise, which presented a corrugated surface at the back, the effect of which was to choke the drainage behind the shaft timbers, as the excavation proceeded downward. By the use of cross-buntons, the curbing was tied to heavy truss-beams at the surface, by means of steel rods inserted in 10-ft. sections.

When the excavation had reached a sufficient depth below the surface to permit of hanging the uppermost section of the curbing the first set of four steel rods, 1½ in. in diameter, were suspended from two heavily trussed beams, so as to hang in the four corners of the shaft, respectively. The four rods passed through and supported two cross-buntons on which the curbing rested. By means of screw couplings other sections were added as the depth increased.

In this manner, and by the use of a steel shoe at the bottom of the shaft, it was possible to pass through the quicksand, after having experienced the loss of five shafts sunk successively in the same locality. In that instance, the surface had sunk 4 or 5 ft. over a large area surrounding the shaft when the coal was finally reached in the sixth shaft.

The pressure on a bed of quicksand will depend much on the nature of the overlying strata. When the quicksand is finally reached, in sinking a shaft, there frequently occurs an outburst of sand and water, which comes without warning, and rises in the shaft to a point equal or corresponding to the head or water level in the strata.

The character of the quicksand bed is quite variable. At times, it may consist almost wholly of fine sand, and, again, the sand may be mixed with boulders or lumps of mud or clay. The water permeating this bed may have its source in a watery stratum lying some distance above the quicksand, and this will explain how it is that the water and sand frequently rise to a great height in the shaft.



SECTION THROUGH SHAFT CURBING

While the use of cement grouting has proved of great value, in many instances, it is often the case that quicksand flows so freely that it is impossible to control or even reduce the inflow into a shaft excavation, after this has once started. In every case, where there is reason to expect an inflow of water or quicksand, test borings should be made at the proposed location of the shaft, and this should be done before the sinking is commenced. The results of these borings will determine both the head and the quantity of water to be encountered in sinking. The borings will also show if quicksands are present and give the depth and thickness of the bed besides showing the character of the strata.

Where a freely flowing quicksand is to be encountered in the sinking of a shaft, it is advisable to resort to what is known as the "freezing process." This consists in sinking a series of boreholes around the proposed excavation and freezing the strata by forcing a freezing mixture through pipes into these holes, till the ground is frozen.

Another method that has been successfully applied is to force a good grouting of hydraulic cement into the holes, until it has permeated and largely solidified the bed of quicksand for a few feet surrounding the shaft. When this method is used, the work must be done before the excavation is started and the quicksand is dormant, as it will not be easy to solidify the quicksand when a flow has once started.

EXAMINATION QUESTIONS

Illinois Mine Managers' Examination, November, 1917

Ques.—The main entry in a mine is driven due east from the bottom of the shaft. There are three pairs of entries turned south off the main east, known as the 1-, 2-, 3-, 4-, 5- and 6-S entries. Fifteen men are at work in the 1-S, 15 men in the 2-S, 15 in the 3-S, 15 in the 4-S, 22 in the 5-S and 15 in the 6-S. Two men are at work in the main east entry and one in the main return entry. How much air should be required to pass through the last open crosscut in each pair of entries?

Ans.—Assuming a nongaseous mine and not estimating on the number of animals required in these entries since no mention is made of them, it will be sufficient to allow 100 cu.ft. of air per minute, for each man employed in each pair of entries. In estimating the quantity of air flowing through the last crosscut, however, it is necessary to consider whether this mine is ventilated by a continuous current or whether the split system of ventilation is employed.

Assuming, then, that each of the three pair of south entries are ventilated by a separate air split that is conducted at once into the main return airway, the quantity of air passing through the crosscut at the face of the 1- and 2-S will be $100(15 + 15) = 3000$ cu.ft. per minute. The same quantity will be required in the 3- and 4-S entries. The quantity required in the 5- and 6-S entries is $100(22 + 15) = 3700$ cu.ft. per minute.

The air passing the face of the main east and return airways, in order to comply with the law, need be only $100(2 + 1) = 300$ cu.ft. per minute. This quantity of air, however, would give a velocity of but 5 or 6 ft. per minute, which would not be sufficient for the ventilation of these places. It is, therefore, better to assume that the air split ventilating the 5- and 6-S entries is conducted to the face of the main east entries, instead of passing directly into the return airway. In that case, however, the quantity of air passing through the crosscut on the 5- and 6-S and the crosscut at the face of the main east entries would be $100(22 + 15 + 2 + 1) = 4000$ cu.ft. per minute.

In case this mine is generating gas, the Illinois coal mining laws require 150 cu.ft. per minute for each man working in the mine. This would increase the quantity of air passing through the several crosscuts mentioned, and make the quantity half again as great.

Ques.—What advantages and disadvantages would you expect by connecting the underground workings of two or more mines, and what dangers are likely to arise therefrom?

Ans.—The advantage of connecting the underground workings of two adjoining mines is that such a connection will afford means for the escape of the men from the workings, in case of emergency arising from a sudden outburst of gas or an explosion occurring in one of the mines. The disadvantage of having such a connection is that, should an explosion occur in one mine and the division doors are blown down, the effect would be felt and the explosion possibly transmitted to the workings of the adjoining mine. Another disadvantage may be experienced in the possible disarrangement of the ventilating current, owing to the setting open of the division doors or the difficulty of preventing the leakage of air from one mine into the other, especially if one is ventilated under the blowing and the other under the exhaust system of ventilation. Unless the doors between the two mines are kept locked, some trouble might arise from the men employed in one mine, paying their visits to the workings of the other mine, which would afford an opportunity for shifting the blame of accidents and making it impossible to determine the responsibility for the same.

The dangers of connecting adjoining mines are those mentioned relating to the possibility of explosion in one mine or the flooding of one mine affecting both mines alike.

Ques.—Is coal dust explosive and, if so, under what conditions?

Ans.—Experience and experiment have both proved that the fine dust of inflammable coal is explosive. The conditions favoring a dust explosion are the fineness of the dust, the inflammability of the coal from which it is formed, the volume and intensity of the flame causing its ignition, and the suspension of the dust in the air. While the presence of methane, even in small amounts, will greatly assist the ignition of the dust and render its explosion more violent, the gas is not a necessary constituent of an explosive atmosphere, which may be due wholly to the presence of a sufficient quantity of fine inflammable dust.

Ques.—What precautions would you adopt to prevent the accumulation of gas on top of falls where it was difficult to remove the gas with the air current?

Ans.—In this case, a special brattice should be erected in such a manner as to deflect the air current to the top of the falls and cause it to sweep the gas coming from the cavity in the roof strata.

Ques.—Should a fall occur on the main intake airway, and a large amount of gas be given off from the roof, what steps would you take to prevent an explosion and rescue the men at work inside?

Ans.—The men should be notified at once to extinguish their lamps. They should be withdrawn from the mine by the shortest and most practicable route to avoid their contact with the gas. It may be possible to short-circuit the air current inby of the fall so that the gas will be carried at once into the return airway and conducted out of the mine. No open light should be permitted under any conditions, and the only safety lamp permitted to burn should be in the hands of the fireboss, who should lead the men out of the mine, to insure their safe escape.

COAL AND COKE NEWS

What Happened in March

Mar. 1—Joint committee appointed by Government officials, eastern railroad representatives and mine operators of Pennsylvania, Maryland and West Virginia to apportion cars to meet the railroad-fuel demand.—Price of coke manufactured in Preston County, West Virginia, between Tunnelton and Grafton and at Meriden, Barbour County, was fixed at $6.75 for blast-furnace coke and $7.75 for selected 72-hr. foundry coke, a rise of 75c.—Flat top or Pocahontas, W. Va., coke is placed at $8, instead of $6 for furnace coke and $7 for foundry coke.—Selected foundry coke, manufactured in Indiana County, Pennsylvania, from washed coal mined from the lower bench of the upper Freeport, is placed at $8 per ton if ash exceeds 10 per cent or the sulphur 0.9 per cent and $8.50 if the ash is less than 10 per cent and the sulphur less than 0.9 per cent.—Byproduct coke at Chattanooga Tenn., is set at $8.25, run of oven, crushed coke over 1-in. in size $8.75 and selected foundry coke $9.25.

Mar. 2—Bill introduced by government of British Columbia for the establishment of an 8-hr. day, bank to bank.

Mar. 4—Public Service Commission holds a hearing relative to the request of A. H. Wiggin, state fuel administrator, that all private power plants in the city of New York be closed down and power requirements supplied by public-service corporations.

Mar. 5—Judge Lovett appointed director of Division of Betterments and Additions in Railroad Administration.—New prices established by Fuel Administration in Wayne County, West Virginia (part of Kenova and Thacker fields). The increase is 40c. per ton making run-of-mine $2.40, prepared sizes $2.65 and slack or screenings $2.15.

Mar. 6—War Industries Board is reorganized, and Bernard M. Baruch is made chairman of National Defense.—Priority given to coal by order of Jan. 17 is removed in all states east of the Mississippi except Pennsylvania, Maryland, West Virginia, Ohio and Eastern Kentucky.—Priority is given to New York Central and Hudson R.R. Co. railroad coal over all other coal contracted for.—Prices granted to certain mines in Preston County, West Virginia, on Feb. 7 made applicable to all mines in county.

Mar. 8—Fuel Administration makes regulations for retailing. Before Apr. 1 all consumers should place orders for one year's fuel requirements in writing. In the case of anthracite, dealers shall proceed to deliver coal till two-thirds of the requirement is supplied. However orders of 6 tons or less may be filled in full. After all consumers willing to accede to deliver till two-thirds of requirement the dealers may supply coal till the full quantity requisitioned is delivered. The dealer may deliver bituminous coal at once up to the full declared requirement. Where the consumer has coal on hand that coal is to be deducted from the annual requirement. No domestic consumer shall purchase or receive more coal and coke than he will need in the year ending Mar. 31, the coal on hand being figured in the receipts. No dealer may sell him more, alone or with other dealers. No dealer may deliver to any one who has not filed with him a statement of the amount of coal on hand, the amount already ordered and the name of the person from whom ordered, the coal used in the year ending Mar. 31, 1918, and the coal required in the year following.—Prices are set by Fuel Administration for Colorado coal. Bituminous domestic coal from the domestic field: Run-of-mine $2.25; prepared sizes $3.50; slack or screenings $1.25. Bituminous steam coal, Trinidad district: Run-of-mine $2.35; prepared sizes, $3.25; slack or screenings, $1.65; Lignite; run-of-mine, $2.25; prepared sizes, $3.25; slack or screenings $1. These figures for bituminous domestic coal shall be reduced 70c. on April 1; 50c. on May 1; 35c. on June 1 and 15c. on Aug. 1 and for bituminous steam coal shall be reduced 40c. on Apr. 1; 30c. on May 1; 20c. on June 1 and 10c. on July 1. To all these figures 45c. may be added where compliance is made with the terms of the Washington Agreement. The order reduces prices considerably.—The Fuel Administration sets the price of run-of-mine at Montana, Wyoming and Utah mines at $2.65; prepared sizes at $3.30; slack and screenings at $1.50. To these figures the 45c. granted in consideration of compliance with the Washington Agreement may be added.

Mar. 9—The Fuel Administration announces that the prices of anthracite will be reduced 30c. per ton from Apr. 1 to Sept. 1 instead of the usual reduction of 50c. in April, 40c. in May and so on till August when only 10c. is usually deducted from the winter circular. It also announces a system of inspection. The coal which proves below standard must be sold for 50c. less than Government prices. Parts of the mine producing coal of inferior value must be closed with due regard to conservation or else provision must be made to clean the coal.—Summer reductions in Colorado will apply only to prepared sizes on both domestic and steam coal. It shall not apply to lignite.—Maximum prices for coal in Marion, Boone and Appanoose fields, Iowa, areas are set as follows: Run-of-mine $2.75; prepared sizes, $3.10; slack or screenings $2.90.

Mar. 10—British government announces that on Mar. 21 it will proceed to the enlistment of 50,000 miners.

Mar. 21—The Somerset coal price field in Pennsylvania is enlarged by adding operations on the Baltimore & Ohio Ry. and from the Somerset County line to and including Indian Creek and the Indian Creek Valley branch of the railroad. The prices are: Run-of-mine, prepared sizes and slack, $2.60 with 45c. added if compliance is made with terms of Washington Agreement. The old prices were $2, $2.25 and $1.75 respectively—Several orders dating back to the order of Jan. 30, 1915, relating to the freight rates on anthracite are vacated by the Interstate Commerce Commission and an increase in rate not to exceed 15c. per long ton is added to the freight rate on anthracite. The freight rates on live stock and fresh meats, petroleum, grain and grain products, brick, clay, cement, lumber and forest products and some other materials are also increased.

Mar. 16—Rules and regulations governing the distribution of coal and coke by persons, firms, corporations and associations subject to license are formulated by the Fuel Administration.

Mar. 20—Manufacturers of box board, paper board, straw board, etc., who reduced their fuel consumption by running 5 days a week resume their full schedule.

Mar. 22—The Fuel Administration announces a new price classification for the entire state of Illinois and for large coal fields in Ohio, Pennsylvania, Virginia and West Virginia.

Mar. 28—New prices are named for Washington, Oklahoma and Arkansas mines.

Mar. 29—Companies and individuals using special means for eliminating impurities from their coal will be permitted to add 20c. to the Government price at the mine.

Mar. 30—United Fuel Administration advises the public to store coal or otherwise there will be a shortage next winter.

Harrisburg, Penn.

Holding that it would be a harsh rule to require corroboration of an accident when it is known that the workmen in mines are frequently employed at isolated points, where accidents cannot be witnessed by others, Judge Strauss (Luzerne County) made an order on Apr. 4 in the appeal taken by Mary Zadwick from a decision of the Workmen's Compensation Board, in which he sustains the appeal of the claimant, reverses the order of the board which set aside the finding of the referee and directs the board to grant a hearing de novo in accordance with the provisions of the act.

The husband of the plaintiff, Joseph Zadwick was taken ill on his way home from work on July 12, 1916, and died Aug. 7. It was claimed his death resulted from a sprain received while he was at his work on July 12, lifting a heavy weight. There was no witness to the lifting or injury, and the Lehigh & Wilkes-Barre Coal Co. appealed from the decision of the referee because there was no relation shown between the accident and the cause of death.

A. Mitchell Palmer, Federal custodian of alien property, has filed more than 50 petitions for reinstatement of claims of nonresident enemy aliens for compensation for deaths of workmen in Pennsylvania, many of whom were subjects of the Austro-Hungarian empire. These claim petitions had previously been disallowed by referees throughout the state because of the failure of claimants to attend hearings and prove their cases.

Arguments on the petitions will be heard on Thursday, Apr. 25, at Philadelphia, and it is expected that Mr. Palmer will appear personally in behalf of the United States Government. It is also anticipated that representatives of coal corporations and insurance companies interested in compensation cases will protest.

The petitions are expected to serve as precedents by which the custodian of alien property will endeavor to have the claims of nonresident aliens in compensation cases tolled until the end of the war. The insurance companies are opposed to this as it will require them to carry a reserve fund in each case. It is estimated that more than a million dollars is involved in the proceedings before the board and most of the cases are said to come from the coal regions.

Birmingham, Ala.

The names of four new coal firms were placed on the incorporation books in the probate office during March, according to a report filed Saturday. The combined capital is $117,000. The new concerns are the Sandstone Coal Mining Co., capital, $2000; The Wabash Coal Mining Co., Inc., capital $10,000; the Cullman Coal Co., capital $5000 and the Black Warrior Coal Co., capital $100,000. The Wabash company filed its first papers early in March with a capitalization of $5000 and later increased this stock to $10,000. These four companies are included in a list of seventeen new companies incorporated in March with a total capitalization of $344,000.

Among the improvements in the fuel field announced during the week is the opening of a new mine three miles west of Leeds, in the northeastern part of this county. The development is under the direction of T. P. Berry, J. M. Donaldson and Tom Stobert and will be known as the Mary Anderson mines. It is officially stated that the company is counting on producing several hundred tons of coal a day within the next few months. The Central of Georgia R.R. has made a survey for a spur track to reach the new mines, which are located in Section 7, Township 17, Range 1, east in Jefferson County.

Another important announcement is that of President George Gordon Crawford, of the Tennessee Coal, Iron and Railroad Co. The company announces the immediate construction of 154 additional byproduct ovens at its immense plant at Fairfield. This development is intended primarily to increase the production of toluol, ammonia and benzol needed in the manufacture of ammunition and also to bring about a saving of hundreds of thousands of tons of coal for coke making in the byproduct plant as over the beehive oven system. The development will entail an outlay of $2,500,000. The company now has 280 byproduct ovens at Fairfield.

In the mining section of the district there is much activity. Labor is needed in every direction. While it is a fact that there are some negroes returning to the district who left here during the past two or three years in the big exodus that carried hundreds of them to Ohio, Pennsylvania, Illinois, West Virginia, Michigan and other states, the demand for labor comes on at a pace that makes a shortage

keenly felt. In all parts of the district the eight-hour day is in operation at the mines, or will be before the end of this month; the semi-monthly pay is in effect and many other concessions have been made to attract labor. Bonus is being allowed at many of the mines for extra work or tonnage, and every effort is being exerted to hold the output of coal up to the maximum.

Reports reaching the office of State Inspector of Mines show that coal production this week was the heaviest ever seen in the state for a similar period, and records indicate that production through new mines this year will be increased by not less than 500,000 tons.

Fairmont, W. Va.

A glance at the figures showing the production of coal for the fiscal year ending June 30, 1917, in the Fairmont district, which is the Monongah division of the Baltimore & Ohio R.R., shows that it is the mines which have been providing railroad fuel which have been prosperous, accepting that the mining of coal means financial success, a proposition on which all coal people stand agreed even though a request was made recently for an advance in selling price.

The leading producers of the Fairmont district did not get out as much coal as could have been mined but the showing is creditable to the district. The Consolidation company mines in the Fairmont district (it has mines in other regions) could have turned out 2,000,000 tons more readily. The Jamison mines in this district (that company also has mines outside the district) were capable of putting out 800,000 tons more. The Hutchinson Coal Co. (which also has mines outside the region) could have turned out 500 000 more tons in the Fairmont district. The Federal Mines at Grant Town, owned by the New England Fuel and Transportation Co., had an over supply of cars part of the time, but the output could have been increased some in the last year. The Wendel mines, which are fourth in the list, supply Baltimore & Ohio fuel, as does the Century Coal Co. and in fact all the operations which are named below, whose production last year is given in net tons:

Consolidation Coal Co., of Fairmont	4,313,624
Jamison Coal and Coke Co., of Fairmont	914,546
Hutchinson Coal Co., of Fairmont	719,179
Maryland Coal and Coke Co., of West Virginia (mines at Wendel)	701 160
Federal Coal and Coke Co., of Grant Town	688,668
West Virginia Coal and Coke Co., of Elkins	666,188
Elkins Coal and Coke Co., of Morgantown	631,197
Century Coal Co., of Century	490,489
Virginia and Pittsburg Coal and Coke Co., of Kingmont	402,277
Four States Coal Co., of Worthington	337,960
Davis Coal and Coke Co., of Baltimore	302,198
Marshall Coal Co. of Mt. Clare	297,081
Fairmont and Cleveland Coal Co., of Rivesville	243,192
Dawson Coal Co., of Clarksburg	241,085
Madeira-Hill-Clark Coal Co., of Wilsonburg	238,501
Monongahela Valley Traction Co., at Baxter	203,894
Virginia-Maryland Coal Corporation, at Shinnston	201,820
Rosemont Coal Co., of Rosemont	179,086
Merchants Coal and Coke Co., of Pennsylvania (mines at Tunnelton)	153,127
Austin Coal and Coke Co. at Austin	135,849
Stafford Coal Co. at Baxter	134,400
Pittsvein Coal Co. at Flemington	132,693
Harry B. Coal and Coke Co. at Clarksburg	128,148
Francois Coal and Coke Co. at Clarksburg	126,317
Central Fairmont Coal Co., of Clarksburg	118,795
Whyel Coal Co., of Monagh	122,783
Lambert Run Coal Co., of Meadowbrook	112,598

T. W. Arnett has varied mining interests with a large output, the total of which would make a good showing in the list, but he operates them under different corporate names. His total tonnage is certainly more than 300,000.

The Clark interests have the Madeira-Hill and Harry B. in this table while they have three other mines, the total of all reaching something like 400,000.

The Lambert Run Coal Co. is one of several interests in which Clarence D. Robinson is prominent. If his three or four other interests were combined the total tonnage would be in the neighborhood of 350,000.

The poor and irregular car supply reduced the output considerably. Some mines got an 80 to 100 per cent. car supply while others only had 20 to 40 per cent. The mines unfortunate under the assigned car policy favored by the railroads lost many men, who scattered with work dull, and this reduced the output where there was a full car supply.

For instance, the Jamison concern has three mines in this district any one of which could probably have equaled the Federal if the car supply had been as good. It is reasonable to estimate that the Jamison mines in this region could have doubled their output with a full car supply.

Charleston, W. Va.

Though expecting official advice from Washington at almost any moment as to the decision of the National Fuel Administration on the selling price of coal in this state, no orders had been promulgated up until the time this was written. Operators are living in hope that their request for a general increase may be complied with, though of course without any definite assurance that such will be the case. The impression seems to prevail that the New River district may be allowed increases but that the Kanawha District will not be given an increase.

Advices from Fairmont during the early part of last week were to the effect that the car supply in that region had been ample during the early part of the week, though it was said the prospects for the remainder of the week were not very encouraging. The lifting of the embargo on eastern shipments also contributed toward easing the situation in the Fairmont territory where it is estimated the regional supply is about 6000 cars short.

Operations at most mines in West Virginia were suspended last Saturday afternoon at the request of the Governor, to permit miners to participate in the parades and patriotic celebrations held throughout the state which signalized the beginning of the Third Liberty Loan campaign. Miners turned out in force at Charleston.

The Marting War Savings Society, consisting mostly of miners, at the organization of their society last week pledged at the first meeting $6100 to be invested in War Savings Stamps. They have set $12,000 as the goal for January 1, 1919.

Looking ahead to the end of the war, a number of the coal associations, representing West Virginia operators have, through their officers, responded to Governor Jno. J. Cornwell's invitation to attend a conference in this city, some time in May, for the purpose of making plans to extend the export trade to South America. While some of the operators take the view that the present is not the time for action, the Governor has urged that it would be shortsighted to wait until the war is over before making plans to establish a market for West Virginia coal in the countries to the south of North America. It was decided not to hold the conference until the end of the present Liberty Loan Campaign.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Voluntary subscription of funds for the Wyoming Valley Chapter of the American Red Cross has netted $5791 from miners and breaker boys in the employ of the Lehigh & Wilkes-Barre Coal Co. Lately the Red Cross has been hard pressed for money, so many have been the appeals and so great the volume of relief work. Mine workers have attempted to tide the organization over until the next Red Cross campaign.

Nanticoke—Anthony Waicik, a miner at the Loomis Colliery of the Delaware, Lackawanna & Western RR., Coal Department, has been taken into court by Mine Inspector Frank Kettle, charged with violating the anthracite mine law by lighting a match in a forbidden place and against orders of the mine foreman. The place where Waicik was employed was very gaseous and the men worked with safety lamps. The defendant was discovered on Jan. 19 smoking a cigarette, thus endangering lives and property through a possible explosion of gas. The case will be tried before a jury.

Pottsville—The barrier pillar case, involving $300,000 lost in coal when the court directed that an immense barrier pillar be left standing between Morea and New Boston collieries, was heard before Judge Bechtel, on Apr. 3. Dodson & Co., who would have mined the coal if not prevented by an injunction, have sued the Delano Brothers for damages, claiming that the right to mine the prohibited pillar of coal was included in their lease and the land owners failed to make it possible to complete the terms of the lease. Intricate legal questions are involved.

Scranton—Anthracite operators have actively enlisted to aid the work of the nation to produce more food. They are making available for war gardens lands which have gone largely unused. The Delaware, Lackawanna & Western and the Delaware & Hudson Coal companies have set aside a big acreage in their region for this utilitarian purpose. The fields are several hundred acres in extent and have a soil, with the proper tilling and enrichment, to produce abundant crops, which will largely supply local needs.

The Lehigh & Wilkes-Barre Coal Co. printed at its own expense thousands of recipe leaflets, teaching the mine workers the different uses of cornmeal as a substitute for wheat and wheat flour. The recipes include other bread substitutes and a bean loaf. The anthracite operators are also teaching the mine workers the ruling of the food administration in food savings.

Coxton—Owing to the present unsatisfactory manner of mixing anthracite and bituminous coal, and loading it on engines, the Lehigh Valley Railroad Co. has started work on a coal crusher and mixer that will cost about $40,000. The new structure will be modern in every particular and will also have a storage department of 1000 tons capacity, from which the mixed coal will be loaded automatically into engine tanks. The company is at present using a great amount of small sized anthracite, and under the existing plan it was found hard to mix this with the lumps of bituminous, while the loading of it at present is done with the aid of a steam crane. Aside from this the company is experiencing all sorts of trouble, as the automatic stokers on the engines will not distribute the fuel properly in the firebox. The new building will be similar to the one the company has at Hazleton.

Nanticoke—During the 26 working days in March the miners in the Truesdale colliery of the Delaware, Lackawanna & Western Railroad Co., Coal Department, produced 141,282 tons of coal, or an average of 5469 tons per day worked. In March, 1917, the colliery produced 125,122 tons but the output for last month exceeds this figure by 16,160 tons, in one day less time worked. This colliery holds the daily, monthly and yearly record for the hard coal field. The one day record is 8513 tons, which required 208 railroad cars.

Shamokin—The fire at the Corbin slope of the Excelsior Coal Co.'s twin collieries was placed under control by washing great quantities of water and culm down the heavy pitching slope in which the fire broke out. This procedure had the effect of closing a tunnel at the bottom of the slope. The fire, however, will continue to rage in the slope proper until the culm is banked high enough on the slope to reach the flames. Culm is being poured into the workings at a rate of 15 tons an hour.

Bituminous

Chambersville—The Shannon Coal Co. has purchased the Kinter mine here and is making large improvements. A concrete bridge has been erected across the creek and the coal will be hauled to the tipple of the Seneca Coal Mining Co. and loaded with the Seneca output on the Buffalo, Rochester & Pittsburgh Railway.

Rosmoyne—The McCombs Coal Co. has installed a set of boilers, air compressor, rope haulage engine and mining machines at its mine here. The output will be greatly increased. The coal is shipped over the Buffalo & Susquehanna Railroad.

Indiana—The Leydic Coal Co., operating a mine on the Clymer branch of the Indiana County street railway, and supplying fuel for the street car company, has leased the Guthrie siding between Indiana and Homer City and has erected loading platforms and a tipple. It has a car rating from the Pennsylvania R.R. The coal is hauled from the mine to the siding, a distance of about 10 miles, on a large electric coal car.

Connellsville—On Monday Apr. 15, the wage increase of 15 per cent. recently announced by the H. C. Frick Coke Co. will go into effect. More than 20,000 coke workers will benefit by the increase.

East Butler—Many farms in the coal region are being offered for sale because of the migration of boys to the munition works and the operation of the draft, al-

though under a recent ruling the Government eligibles engaged in agricultural work are not to be sent to camp until after the harvests. Hundreds of Slavonian and Polish miners are buying land, and it is predicted that they will be the farmers of the future throughout the anthracite region of the state. Most of these persons lived on farms before they came to this country and are more experienced as farmers than as miners.

Uniontown—An early adjustment of the J. V. Thompson affairs now seems probable, as the Hill Syndicate options will either be taken up or abandoned by Apr. 21. It is considered likely that the West Virginia and Pennsylvania coal properties would be purchases, which would mean the final winding up of the debts and affairs of Mr. Thompson, who will see his estate, figured conservatively at sixty million dollars in value, wiped out to pay debts of about thirty million dollars. The Hill Syndicate if it comes into possession of the vast acreage held by Thompson, will become the chief factor in the eastern bituminous coal reserves of the nation.

Pittsburgh—Industrial corporations which have been securing part of their coal from wagon mines have notified the owners of these mines that in the future they intend to purchase their coal from larger operators. This action has called forth expressions of disappointment and dissatisfaction from the wagon mine owners who have appealed to district representatives and the Fuel Administration.

WEST VIRGINIA

Elm Grove—The Century Coal Co., headed by David H. Thomas, of St. Clairsville, Ohio, is getting both openings at its plant here in shape for loading. Grading for the sidetracks is now going forward.

Morgantown—The New England Fuel and Transportation Co. has transferred all the Pittsburgh vein of coal and mining privileges in 157 acres of the tract recently purchased, to John F. Phillips and C. D. Robinson, of Fairmont. This tract was originally known as the Elkins tract and was purchased by the New England Fuel and Transportation Co., which has resold a great quantity of the coal, nearly every company in this section acquiring more or less of it.

Elk Garden—A new opening is being developed by the Mapleville Coal Co., which recently took over a large tract of coal land, consisting of 340 acres of the old No. 15 mine on Elk Garden branch. At present mining is being carried on in the Bakerstown bed, with the expectation that the Freeport bed will be worked by the Abraham Creek Coal Co. by May 15.

Shinnston—A coal storage bin recently completed at Owings, near here, is of frame construction on a concrete foundation. The bin, which is 35 x 100 ft., has a capacity of about 1800 tons of run-of-mine coal. It is constructed of longleaf yellow pine which has been thoroughly treated with preservative. Coal is dumped over the tipple in the usual way, going from the chutes into a conveyor by which it is carried to the top of the bin and deposited where desired by gates which can be opened or closed. The machinery employed is electrically driven.

Farmington—The Jamison Coal and Coke Co. has installed a coke machine for the 120 ovens at the No. 8 mine. About half of the ovens are already being pulled.

Weston—The Lynch Coal Co. will open a tipple mine here at once, having acquired 500 acres of Redstone vein of coal and 200 acres of surface.

Beckley—With C. R. Stahl, assistant general manager in charge of the work, the E. E. White Coal Co. is building a concrete road and making other improvements at Stotesbury.

Fairmont—The Hope Natural Gas Co. is branching out in the coal business, having perfected plans to develop its 500 acres of coal land in Marion County, the coal to be utilized in making byproducts.

Charleston—Traffic on the Ansted Branch of the C. & O. was only resumed within the last week, it being impossible to operate trains on that branch since the flood of March 14.

Fayetteville—The installation of several new motors by the Price Hill Colliery Co. will enable that concern to produce its maximum tonnage within the next few days, the tonnage having been limited to about 100 tons daily up to this time, because of insufficient equipment.

Wheeling—Water shipments will be discontinued by the West Virginia & Pittsburgh Coal Co., the company having signified its intention of disposing of its river craft and of shipping coal from its Gilchrist and Colliers plant by rail. The company owns two river steamers and a fleet of barges.

Wellsburg—Suit for $10,000 has been instituted against the West Virginia-Pittsburg Coal Co., operating in Brooke County, by Samuel Logan, father of Ray Logan, who was killed at the Gilchrist mine of the company a few weeks ago. As Logan was the miner's checkweighman, it is said that his death does not come within the purview of the Workmen's Compensation Act.

INDIANA

Petersburg—Coal mines along the E. & I. R.R., on Apr. 2 closed down, claiming that prohibitive freight rates made it impossible to operate profitably in competition with other lines. About 800 miners were released, many of whom are leaving the field.

ILLINOIS

O'Fallon—Joseph Schmit has been arrested by Deputy State Fire Marshal Richards in connection with the explosion of two kegs of powder two weeks ago in the Prairie mine. Schmit, who was employed at the mine, was the first man to reach the surface after the explosion. More than 100 miners have quit work at the Prairie mine on account of the adoption of resolutions by the employees providing that every foreign-born man must show naturalization papers before being permitted to enter the mine. Formerly 380 men were employed at the mine. Now there are less than 275. The company operating the mine has contracts for furnishing fuel to several munitions plants.

Lebanon—The People's Coal Co., which has operated the Lebanon mine for the past eight years under a lease, turned the property over to the owners, the Premier Coal and Mining Co., on Saturday Mar. 29. The Premier company also purchased the machinery and equipment, and will operate the mine in the future. The People's company, of which H. C. Chapple is president and General Manager, will continue to operate the Devil's Hole mine near Caseyville, which was purchased last year. William Kolb, head of the Premier company, announces that repairs will be made and the capacity of the shaft increased. Thomas Jones, for several years a mine examiner, has been employed as pitboss.

OHIO

Martin's Ferry—The Pursglove-Maher Coal Co., one of the largest producers in eastern Ohio, will open a large mine west of its Maher plant at Glencoe. It is expected work will be started as soon as material is obtained. The new mine will tap the coal owned by the Pursglove-Maher interests between Glencoe and the Crambers schoolhouse, just south of St. Clairsville.

Adena—The Stellar Coal Co. expects to begin cutting coal this week. Its mine taps the W. B. Francis coal, which is to be mined on a royalty basis. The Costanzo-Monaco interests, which sold their Wheeling Valley Coal Co. to Goodyear Rubber Co. men recently are the owners of the Stellar.

KENTUCKY

Wheelwright—The Elkhorn Coal Corporation is now shipping coal from its mines here at the rate of 1200 tons a day, and this volume is to be substantially increased during the coming season. The coal is said to be of a high grade, and contracts for future delivery cover the output for the remainder of the year. The company is now operating 22 mines.

Whitesburg—The Kentucky Elkhorn Coal Co. had filed amended articles of incorporation increasing its capital stock from $10,000 to $75,000 in order to start the big development work that is scheduled.

Dawson Springs—The Dawson Hotel Corporation, which is planning a large resort hotel, has been forced to give up its plans, the Government holding that the work is not a necessity. The company has decided to begin work at once on development of its coal properties and start several mines instead of building the resort.

Frankfort—The State Legislature recently passed a law under which the chief mine inspector will be required to furnish maps of mines to owners of adjoining property who file affidavits to the effect that the mine is encroaching upon their property.

Pineville—The Kentucky Ridge Coal Co., a corporation, on the first day of April dissolved, action having been taken at a directors' meeting at Straight Creek on Mar. 1. The company has transferred property to E. W. Pittman, of Straight Creek; A. G. Stith, of Louisville and J. A. Swarts, of Straight Creek, who under a partnership will continue operating the mine as the Kentucky Ridge Coal Co.

COLORADO

Cowie—The coal mine here has been developed and equipped and is now producing from 6 to 8 tons per day. The seam is about 5 ft. thick and is a good grade of lignite. It is planned to haul the coal in wagons a distance of about 5¾ miles to the Boulder market, where it will be retailed direct to consumers. The operators estimate that they will be able to produce 100 tons a day after about six months further development.

Foreign News

Montevideo, Uruguay—Experiments conducted here to discover the practicability of bituminous schist as a substitute for fuel oil in electric plants show that there are 9500 calories per cubic meter in the oil recovered from schist as compared with 10,000 in fuel oil. According to Craig W. Wadsworth, chargé d' affaires in Montevideo, the oil obtained from bituminous schist has been tried with good results in semi-Diesel engines.

Personals

Tipton Stillwell, of St. Louis, Mo., formerly with the Johnston City Coal Co., has accepted a position with the Boehmer Coal Co. as sales manager.

John N. Powers, of Frostburg, Md., has been made the new mine inspector for Maryland, having been endorsed by the state central committee of Allegany County.

Charles Carrol, chief electrician of the Iselin mines of the Pittsburgh Gas Coal Co. Iselin, Penn., has been made superintendent of the Coy mines of the Brush Creek Coal Mining Co. at Homer City, Penn.

William Slater, superintendent of the Blaine (Ohio) mine of the Lorain Coal and Dock Co., of Columbus, has resigned to take charge of a mine at Brilliant. Mr. Slater's successor has not been named.

Irving Cox, of Mill Creek L. I., has been appointed fuel administrator for Nassau County on Long Island, succeeding Anton G. Hodenpyl, who resigned. Mr. Cox was the fuel administrator for the Oyster Bay section by appointment of Mr. Hodenpyl.

Robert S. Blake, formerly connected with the Condit Electric and Manufacturing Co., of Boston, representing it in Pittsburgh, is now district manager for the Duquesne Electric and Manufacturing Co. in its Chicago office, located at 230 So. LaSalle Street.

W. Guy Srodes, of Wheeling, W. Va., has been promoted from the position of general superintendent of the George M. Jones coal interests in eastern Ohio, to the position of assistant general manager of all the operatives of the same company, with headquarters at Toledo, Ohio.

Edward de V. Tompkins, Mem. Am. Soc. C. E., consulting and constructing engineer, who has for the past seven years had offices in the Professional Building, 17 East 38th St., New York City, has moved to Chicago to take the general agency of the Cement Gun Co., Inc., of Allentown, Penn., in charge of the Midwest territory, with headquarters in the Fisher Building, Chicago, Ill.

Obituary

Thomas Masters, a coal operator of East Bernstadt, Laurel County, Kentucky, was killed in a boiler explosion on Apr. 30. The explosion followed a cyclone which swept the city,

Alexander Bradley, aged 60, of Mt. Olive, Ill., died on Apr. 1 at the hospital here after an illness of six months. He gained nation-wide fame as a leader of Illinois coal miners when during the strike of 1897 he marched with an army of 500 miners through many Illinois counties. He was since his illness taken care of by the miners' union.

James Edmund Rutledge, 56 years old, president of the Rutledge and Taylor Coal

Co., of Chicago and St. Louis, died suddenly at Chicago on Apr. 6. Deceased was born at Bloomington, Ill., Oct. 30, 1861, and was a prominent figure in commercial circles in St. Louis and Chicago. He was interested in mines at Duquoin, Nokomis, Livingston and Taylorville, Ill. He was also president of the Standard Briquette Fuel Co., of Kansas City.

Publications Received

Monthly Statement of Coal-Mine Fatalities in the United States, November, 1917. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 32 pp., 6 x 9¼ in.

Five Ways of Saving Fuel in Heating Houses. By Henry Kreisinger. Department of the Interior, Bureau of Mines. Technical Paper 199. Illustrated, 10 pp., 6 x 9¼ in.

New Views of the Combustion of the Volatile Matter in Coal. By S. H. Katz. Department of the Interior, Bureau of Mines. Technical Paper 183. Illustrated, 13 pp., 6 x 9 in.

Occupational Hazards at Blast Furnace Plants and Accident Prevention. Based on Records of Accidents at Blast Furnaces in Pennsylvania in 1915. By Frederick H. Willcox. Department of the Interior, Bureau of Mines. Bulletin 140. Illustrated, 147 pp., 6 x 9 in.

The Mining Industry in the Territory of Alaska, During the Calendar Year 1916. By Sumner S. Smith, United States Mine Inspector. Department of the Interior, Bureau of Mines. Unillustrated, 85 pp., 6 x 9 in.

Abstracts of Current Decisions on Mines and Mining, Reported from May to August, 1917. By J. W. Thompson. Department of the Interior, Bureau of Mines. Unillustrated, 110 pp., 6 x 9 in.

Recent Coal and Coke Patents

Coal Breaker Construction. J. L. Hiller, assignor to Pennsylvania Crusher Co., New York, N. Y., 1,254,137. Jan. 22, 1918. Filed May 1, 1911. Serial No. 624,291.

Tilting Platform for Mine Car Dumps. J. A. Nolan, Bowerston, Ohio, 1,254,622. Jan. 22, 1918. Filed Sept. 30, 1916. Serial No. 123,146.

Apparatus for Removal of Coal Ash. M. Leblanc, assignor to Westinghouse Electric and Manufacturing Co., Pittsburgh, Penn., 1,254,244. Jan. 22, 1918. Filed May 9, 1914. Serial No. 837,557.

Control Mechanism for Automatic Safety Mine Car Cages. J. A. Nolan, Bowerston, Ohio, 1,254,622. Jan. 22, 1918. Filed Sept. 30, 1916. Serial No. 123,147.

Gas Producer. E. A. W. Jefferies, assignor to Morgan Construction Co., Worcester, Mass., 1,255,015. Jan. 29, 1918. Filed Dec. 14, 1904. Serial No. 877,004.

Coke Oven. P. Plantinga,, Cleveland, Ohio, 1,255,047. Jan. 29, 1918. Filed July 26, 1916. Serial No. 111,527.

Mine Car Wheel. T. P. Otterson, Krebs, Okla., 1,255,780. Feb. 5, 1918. Filed Aug. 8, 1917. Serial No. 185,075.

Intermittent Operating Mechanism for Coal Cutters. J. Valencich, Hastings, Ohio, 1,255,669. Feb. 5, 1918. Filed Mar. 14, 1917. Serial No. 154,731.

Coke Oven. F. A. Bredel and J. Bergman, St. Louis, Mo., 1,255,579. Feb. 5, 1918. Filed Aug. 22, 1916. Serial No. 116,241.

Industrial News

Connellsville, Penn.—Coke production in the Connellsville region for the first quarter of 1918 showed a decrease of 662,774 tons, when compared with production for the same period of 1917.

Wheeling, W. Va.—The Industrial Coal Co., which has holdings at Uniontown, in Belmont County, Ohio, turned down seven offers for its disposal after a two days' session of the stockholders.

New York, N. Y.—During February there were exported from the Port of New York, 1184 tons of anthracite; 2157 tons of bituminous and 44 tons of coke. To Canada was sent 945 tons of anthracite, and Cuba received 1776 tons of bituminous.

Washington, D. C.—The Colorado Midland R.R. recently applied to the Interstate Commerce Commission for increases of from 25 to 50c. a ton on bituminous coal from points on its line in Colorado to destinations in Kansas, on the Rock Island.

Charleston, W. Va.—An organization of coal shippers on the line of the Kanawha & Michigan Ry. has been formed, with J. W. Dawson, of Charleston, for president; W. K. Bridges, of Smithers, secretary-treasurer and H. L. Warner, of Longacre, vice president.

Louisville, Ky.—Western Kentucky coal operators who have in the past been delivering considerable coal in New Albany and Jeffersonville, Ind., directly across the river from Louisville, under the new zone ruling which recently went into effect are cut off from these two towns entirely. It is believed that the order will be modified shortly.

Louisville, Ky.—A bill which was in the State Legislature, and which recently became a law, will require the approval of the county judge of any district before mineral rights to property in that district, held in trust, may be leased. Leasing of property held in trust has caused much trouble in the past, and the new regulation may improve conditions materially.

Princeton, W. Va.—Rumor is rife to the effect that a move is on foot to embrace the Norfolk & Western, the Virginian and the Chesapeake & Ohio railroads in one district under one management. The reason assigned for a districting of this kind is the alleged troubles of operations in this field in getting a supply of cars, particularly in the Virginian and Chesapeake & Ohio fields.

Cincinnati, Ohio—John S. Jones, president of the Sunday Creek Coal Co., has filed in the United States District Court a petition for confirmation of the alleged sale by the Hocking Valley Railroad Co. of bonds of $2 506,000 of the Sunday Creek Co. to him. He alleges that the railroad company agreed to sell him the bonds for $625,000, but that the agreement has not been carried out.

New York, N. Y.—Charles S. Thorne, who recently organized the New River Fuel Co., of which he is the president, has opened offices at 50 East 42d St. The offices of the Black Band Fuel Co., of which Mr. Thorne is also the president, will likewise be located at the same address. Mr. Thorne resigned recently as vice president of the Pocahontas Consolidated Collieries Co., Inc., of which he was vice president, as well as from several other concerns.

Logan, W. Va.—The Guvan Valley Coal Operators Association has been recently reorganized under the name of the Logan Coal Operators Association, with headquarters at Logan, W. Va. A. R. Beisel, general manager of the Main Island Creek Coal Co., has been elected president; J. J. Ross, vice president; A. H. Land, secretary, and C. W. Jones, treasurer. P. J. O'Riley has been appointed president of the Labor Committee and H. S. Gay, Jr., secretary.

Cleveland, Ohio—A stiff fight resulted at the meeting of the Ore & Coal Exchange at this place Apr. 4, when efforts were made to exclude Hocking and Pomeroy mine-run from the classifications of pool numbers. In fact action had been taken to exclude such numbers, but through efforts of P. A Coen, president of the Buckeye Coal and Railway Co., and W. D. McKinne commissioner of the Southern Ohio Coal Exchange, such classifications were provided for.

Frankfort, Ky.—The Union Coal Co., of Mercer, Ky., with a capital stock of $100,000, has been incorporated by J. R. Collins, P. J. Billings S. H. Fraser and S. C. Eaves. Other companies recently filing articles at Frankfort were: Clinton Coal Co., Jett, Ky., capital $30,000, D. C. Coombs, A. M. Gross and others; Clay County Coal Co., Manchester, Ky., $10,000, G. B. Mays, W. C. Black and others; Frost Coal Co., Wilton, capital $10 000, John Frost, Charles Frost and others.

Columbus, Ohio—Bids have been requested by George A. Borden, president of the Columbus Board of Purchase, for 4800 tons of nut, pea and slack for the garbage and refuse disposal plant; 10,000 tons of nut, pea and slack and 30 tons of lump for the waterworks department and various smaller amounts for other city departments. The bids are to be opened Apr. 22. It is believed that some bids will be submitted, although at the last advertisement a month ago no bids were filed.

Pittsburgh, Penn.—The Pittsburgh Coal Producers Association, representing about 95 per cent. of the coal mines in the Pittsburgh district has made a vigorous protest against the proposed transfer of the Bureau of Mines from the Department of the Interior to the War Department. They argue that the bureau has been efficiently handled by the Department of the Interior and that it would be a mistake and likely impair the efficiency of the bureau were the authority given over to the War Department.

Roanoke, Va.—The Virginia Iron, Coal and Coke Co. has issued its report covering the fiscal year ended June 30, 1917, and the six months ended Dec. 31, 1917. Net profits for the twelve-month period amounted to $1,024,364, equivalent to $10.24 a share on $10 000,000 of stock, as compared with a deficit of $248,094 reported for the preceding fiscal year. Gross earnings for the six months ended Dec. 31 last amounted to $5,314,323 and net earnings were $1,283,820. The net profit for the period was $873,179 after all charges, including $216,650 for taxes and $121,099 for bond interest.

Pittsburgh, Penn.—The United Coal Corporation held its second annual dinner, including heads of departments, superintendents and mine clerks, at the Fort Pitt Hotel, Pittsburgh, Penn., Saturday evening, Apr. 6. Covers were laid for about 40. Edward H. Coxe, general superintendent, acted as master of ceremonies and toastmaster, and the principle talk of the evening was made by President W. Guthrie, who made a strong appeal to all present to do not only their bit, but their utmost in every way possible to help win the war. Talks were also given by a number of other officials.

Columbus, Ohio—The Akron-Gauley River Coal Co., recently incorporated with an authorized capital of $250,000 by Columbus and Akron men, has been organized by the election of H. W. Jenkins, of Columbus, president and general manager; B. M. Moody, Akron, vice president, and Charles A. Coakwell, Akron, secretary and treasurer. The main offices will be at Akron but the operating office will be in Columbus. The product will be sold through the H. W. Jenkins Coal Co., of Columbus. The company has taken over a mine and 1500 acres of coal land on Gauley River on the C. & O. and the K. & M. railroads. The present output of 300 tons daily will soon be doubled.

New York, N. Y.—M. F. Burns, president of Burns Bros., is the chairman of the coal trade division of the Liberty Loan Committee; Harry T. Peters, of Williams & Peters, director of speakers, and Joseph W. Chambers is the secretary. Committees representing the retail dealers have been appointed in the various boroughs. The wholesale committee consists of Thomas Dickson, of Dickson & Eddy; J. F. Birmingham, president, Delaware, Lackawanna & Western R.R., Coal Department; H. E. Meeker, of Meeker & Co.; John W. Whiteley, Whitney & Kemmerer; Robert B. Baker, Sterling Coal Co.; George M. Dexter, Dexter & Carpenter; and G. N. Wilson, president, Lehigh Valley Coal Sales Co.

Denver, Colo.—At the annual meeting of the stockholders of the Midwest Coal & Iron Co., held here on Mar. 14, 1918, the stockholders authorized the directors to issue its negotiable coupon bonds to the amount of $125,000 bearing 7 per cent, interest, bonds to mature in five years and optional after two years at 105, interest and principal payable at the First National Bank of Denver, Colorado, which is acting as trustee for the bondholders. These bonds will be handled by local brokers, as well as brokers in Chicago Illinois and Lansing, Mich. The money derived from the sale of these bonds will be used for the purchase of additional property and for additional machinery at the company's coal mines in Palisade, Colo. These mines are being put in shape to increase the tonnage, considerably.

St. Louis, Mo.—Jackson Johnson, president of the Chamber of Commerce, has written to Director General McAdoo urging the appointment of a regional director of railroads to be stationed in St. Louis, under the direction of Regional Director Aishton of Chicago. The letter points out that five trunk lines terminating in St. Louis extend to the southwest and do not reach Chicago, and it is argued that to place these under a regional director with headquarters in Chicago is an awkward and unnatural arrangement. It is contended that the resources of the Southwest would be utilized more efficiently for the benefit of the Government and the commercial interests would be better conserved if a regional director were placed in charge of the southwestern railroads and the switching district of St. Louis.

MARKET DEPARTMENT

Weekly Review

Anthracite Output Encouraging, Though Field Is Short of Labor—Bituminous Production Discouraging—Railroad Fuel Situation Menaces Industry—Zoning Plan Not Strictly Adhered To—Fuel Administrator Slow in Approving Contracts

FROM the anthracite fields come encouraging reports of increased outputs, notwithstanding the shortage in labor, which promises to become more serious because of the new draft call the latter part of this month. The available labor supply in the hard coal regions is so utterly inadequate that operators are asking for the exemption of their workers on the ground that their services are urgently needed to keep up production. Anthracite is now moving freely to all points of consignment. To further aid in the distribution of coal and to prepare for what will surely be a record-breaking summer, some of the anthracite operators are building new washeries and rearranging old breakers to permit of the loading of 50-ton cars instead of the 25- and 30-ton cars formerly loaded.

As yet there has been no decision regarding the prices of steam coals, and all sales of these grades are being made at the prices which prevailed last year. It is generally believed that the Government will fix the prices on these coals and that this decision will come when the contracts which have been drawn up and sent to the Fuel Administration for approval are acted upon.

Production of bituminous coal continues to be disappointing. To such an extent has the car shortage interfered with the operation of the mines that the miners are becoming restive over their reduced working time. It was hoped that the elimination of most of the priority orders in the central Pennsylvania region would favorably affect the car situation, but this is not proving to be the case.

Another factor, and one fraught with grave consequences, has entered into the situation; and unless immediate steps are taken to prevent it, the country will witness the demoralization of the bituminous coal-mining industry. It is no mere shadow at which these remarks are aimed, but at an actual, menacing reality that bids fair to set at naught the careful plans of the Federal Fuel Administrator and bring about a crisis that will hamper the nation in its efforts to push its war activities to their maximum.

This condition has been precipitated by John Skelton Williams, in charge of purchases for the railroads, who insists that the roads be permitted to distribute cars where and how they please, and to use such control of shipping facilities for the purpose of forcing price concessions from coal producers. Thus we are confronted with the amazing spectacle of one Government activity setting at naught the edicts and rulings of another Government activity.

The Fuel Administration asserts that coal should be furnished all consumers, whether large or small, at the same price. The railroad officials refuse to accept Dr. Garfield's ruling under the specious plea that to do so would add millions of dollars to the railroads' coal bill, something that Mr. McAdoo and Mr. Williams do not wish to do, as they are evidently desirous of showing a large saving in Government operation of the railroads.

In the past, conditions were such that the roads, which take a large percentage of the entire coal production of the country, could not be prevented from securing their coal at cost, or below cost, and industrial consumers paid the difference. Now that the railroads are under Government control no valid reason exists for an adherence to the old policy. However, this practice is still being followed by the railroads, which in many instances have refused to supply cars to mines until "satisfactory" prices have been quoted for railroad fuel.

Unless the mines get cars in which to ship coal to market, they can not operate; and if they do not operate our many vital industries will find themselves clamoring for coal which is still in the ground. Already a number of operations in each mining district have suspended pending an adjustment of this difficulty, and this at a time when the output of soft coal for the first three months of this year is far behind the output of the corresponding period of 1917.

This is stimulation of production with a vengeance. Unless Mr. Williams' demand for cheap coal is withdrawn, it is apparent that more and more mines will be financially embarrassed and production seriously curtailed. The Fuel Administration and the railroad authorities are deadlocked in the matter, and it is likely the President will have to decide the question. That President Wilson will not be a party to any such questionable plan as that proposed by Mr. Williams is a foregone conclusion.

Though the zoning plan is now in effect it cannot be said that all shipments are being made strictly in accordance with its requirements. Occasions arise wherein the need for fuel is so urgent that the provisions of the plan cannot be lived up to fully as yet. However, shippers are of the belief that the zone plan will eventually be the means of avoiding and overcoming many of the difficulties of distribution.

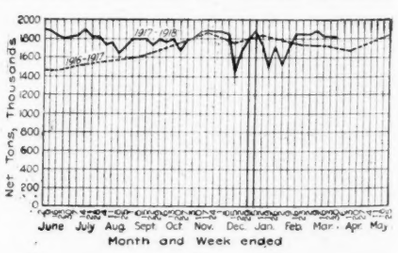
There is a little contract activity, though only the larger concerns are afforded the opportunity of closing contracts, which are made as a matter of policy. On such agreements as have been closed the Fuel Administration is slow to mark its approval, a fact which is causing some uneasiness among consumers who have closed in this way.

COAL PRODUCTION

The output of bituminous coal decreased slightly during the week ended Mar. 30. The total production (including lignite and coal made into coke) is estimated at 10,832,000 net tons, an average production per working day of 1,805,000 compared with 1,833,000 net tons, the average production per working day during the previous week.

The total production of behive coke is estimated at 622,000 net tons or 104,000 net tons, per working day, as against 111,000 net tons for the week of March 23.

During the week ended Mar. 23 the 3984 mines reporting produced 7,763,482 net tons, or 69.3 per cent. of their full-time capacity, compared with 66.8 per cent. reported for the week ended Mar. 16. Losses attributed



to lack of coal cars amounted to 20.6 per cent.; those due to labor shortage 2.3 per cent.; and those due to mine disability to 3.4 per cent. All districts in Pennsylvania (with the exception of the western) report greater losses in production, due to car shortage. The Irwin gas district reports a decline in production from 71.2 per cent. of full-time capacity during week ended Mar. 16 to 56.3 per cent. during the week of the 23d. The Hazard field in Kentucky also reports a decline in production. The southern Ohio district and the Panhandle district in West Virginia show better working conditions due mainly to improved car conditions.

Beehive Coke—Operators in the beehive coke regions of the Connellsville, Greenburg and Latrobe districts of Pennsylvania report the production of 283,745 net tons of coke during the week ended Mar. 30, or 63.7 per cent. of their full-time capacity. Losses due to shortage of yard labor amounted to 81. per cent. of capacity. Losses

due to lack of cars are reported as 24.3 per cent. as against 23.4 per cent. for week of Mar. 23. The same operators produced 178,750 net tons of coal.

Byproduct Coke—Byproduct coke output during the week ended Mar. 30 showed a slight improvement over the previous week. The ratio of tonnage produced to maximum capacity rose from 87.6 to 88.7 per cent. The improvement was effected by a better supply of coal. Losses due to that cause declined from 6.6 to 5.2 per cent., while losses due to repairs to plant increased from 4.1 to 4.7 per cent. The ratio of production to capacity declined slightly in Kentucky, Minnesota, New Jersey and Ohio. West Virginia reported the greatest improvement, ratio of production to capacity rose from 82.7 per cent. during week of Mar. 23 to 98.9 per cent. during the present week.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Mar. 9	Mar. 16	Mar. 23	Mar. 30
Bituminous shipments, 123 roads	200,239	190,298	191,127*	189,252†
Anthracite shipments, 9 roads	41,807	42,265	42,487*	43,642†
Beehive coke shipments, 4 roads	13,032	13,218	13,643*	12,768†

* Revised from last report. † Subject to revision.

Anthracite shipments increased from 42,487 to 43,642 cars.

BUSINESS OPINIONS

Bradstreet's—Good trade, activity in essential industries, increased outputs, improved transportation facilities, less unrest in labor circles, favorable crop news, some further ease in foodstuffs, the drive to make the third Liberty Loan successful, the rush to pay income taxes, and the ready adoption of the daylight saving plan, are leading features. But the single factor that looms largest is Governmental domination, which is extending, is bound to spread as the country gets more and more to a war basis, and which tends to become more controlling in respect to prices.

Iron Age—Steel mills have been under pressure from Washington in the past week in an effort to have January and February shortages made up, particularly those in plates. The mills have had the help of a better car supply, which in the Pittsburgh district has been especially fortunate in view of the large proportion of output required by the Government. The leading producer there has turned nearly 90 per cent. of its recent production into Government and war contract channels, and several plants in the same district that lately have given 60 to 75 per cent of their production to such business are now considerably exceeding these figures.

Atlantic Seaboard

BOSTON

Outlook unchanged; no developments of any consequence. Congestion increases at New England gateways and embargoes are effective on several of the connecting lines. Bituminous distributors, however, for the most part have little or no coal. Anthracite houses little better off. Tidewater shipments seriously handicapped by lack of tugs and rail deliveries are alarmingly in arrears.

Bituminous—A week of April has passed and there is still no effective move toward speeding up production. State administrators in New England are besieged with inquiries as to contracts, and for a very large proportion of the consumers there is no answer; as the operators are not committing themselves. The less scrupulous producers are making no secret of "premium" coal, and it is queried how long such practices will be permitted to continue and other operators who are following regulations in good faith put to such an unwarranted disadvantage. For a time such sales of "spot" coal were understood to be confined to parts of the Pittsburgh region, but now it is common rumor that illicit sales have spread to central Pennsylvania.

The outlook is as complicated and unsettled as ever. Nobody knows what to do. To the buyer there is abundant advice to make contracts, but the parties with whom customary contracts have been made are unable to get an assurance from the operator who has the coal, and the latter is trying to get some inkling of the Government's plans for distribution. Should consumers seek to buy greatly in excess of their needs through fear of shortage, it would take minute policing to adjust equitably the deliveries made.

There is increased congestion at Maybrook and Harlem River, the New York, New Haven & Hartford gateways to New England. Embargoes have been placed by connecting lines against the Baltimore & Maryland, although the Boston & Albany is as yet unaffected. At Harlem River alone there is an accumulation of 3000 freight cars, with just about the same number being hauled east each day as reach there from the mines. The New England railroads are sending empties to the mines now in the effort to increase receipts of engine coal, and one result is the scarcity of cars at rehandling wharves where coal is sent inland.

After the reduced volume of coal moving to Hampton Roads of last week receipts showed an increase. So much coal was routed for Chicago and other points which were embargoed Apr. 1 that there was much congestion at the scale points. Lack of motive power is another factor; in some cases the movement on one of the roads was hardly in excess of 300 to 400 cars daily. On this basis there would be no chance of doing a normal business over the Virginia piers, let alone an increase of two to three million tons for New England. There are rumors of Kanawha coal being reserved to eastbound movement, but as yet this is without confirmation.

There are practically no barges available from Hampton Roads that are not already under charter. It develops also that several of the coal agencies have in sufficient coal to load promptly all the vessels that report for cargo. The "Ulysses" a Panama collier, had to wait an undue time last trip and it was partly to avoid such situations that Mr. Storrow ceased loading coal on his own account and asked the regular shippers to furnish cargoes. The result is that practically all the water-borne coal is now coming through the usual channels and is distributed by the coal factors under the fuel administration. All-rail "Storrow" coal is still coming forward, although the tonnage is now reduced far below the allotment. In one or two districts the number of cars is placed through the deputy distributor, and so far this system seems to be working satisfactorily. It is of course an expedient for doing away with assigned cars and for regulating distribution.

Houses who have been in business for a generation are still telling their customers they see no prospect for contracts. One firm that had 20,000 tons weekly due on 1917 obligations actually got shipped 3018 tons in January and February. Instances of this can be multiplied. Meanwhile there seems to be no definite understanding about railroad coal. Effort is being made at Washington for a lower price for railroads because to a considerable extent they furnish cars independent of the usual distributive share and then, too, there is a feeling that being Government-controlled there ought not to be any commission paid by the railroads. These are only a few of the problems now arising.

Jobbers' licenses in this territory have now been received for the most part, although the way is not yet smooth. The regulations are by no means clear and there is uncertainty over the invoicing of coal by parties not the actual owners thereof. And then besides there is the difficulty about getting the coal to bill. If it comes forward no faster than during the first week in April there will not be so much occasion for worry over the heavy penalty prescribed. A lot of unnecessary inconvenience will result from sundry interpretations of the rules, and yet there are practices strictly within the regulations that are recognized by the trade as glaring abuses. Take for instance two rehandlers having wharves of their own, coal, and all the facilities for transshipment inland. One's price is $8.13 f.o.b. cars and another's is $11.20, both selling the same grade and similarly placed with regard to receiving coal and selling the same consumers to greater or less extent. Both are selling, presumably, in strict accord with rulings of the fuel authorities. What is the answer? A little attention to matters of this kind would be a welcome sign.

Last week the Hampton Roads situation was almost acute due to lack of coal to load bottoms that were waiting. This is now somewhat improved although the number of cars under load has not increased to the extent necessary to clear steamers and barges without undue delay. Shippers frequently find themselves with actually no coal available, notwithstanding they have ample tonnage standing to their credit in the Tidewater Coal Exchange.

Anthracite—Both all-rail and by water April shipments are disappointing. Water movement is seriously hampered by the lack of tugs, and rail deliveries are held up by embargoes. The freight congestion at Harlem River shows signs of clearing up, it being understood that for the present the New Haven Road will accept from each shipper 25 cars per day. Eastern retailers are getting alarmed over the outlook but are powerless to act.

NEW YORK

Anthracite market continues active with heavy demand. Dealers to heed Garfield's warning. Mines are working steadily but further labor shortage is feared. Efforts of railroads to make contracts below Government prices cause agitation among operators. Some mines are favored while others work hardly half time. Government intervention hoped for.

Anthracite—The situation continues to be active with the demand heavy, but lacking the urgency for shipments that existed a few weeks ago. There has been a heavy booking of orders which indicates that the tonnages that will come here will be easily taken care of. Some relief in the situation is expected in the warning sent out from Washington that dealers should not supply domestic sizes of anthracite for industrial purposes where it is to replace bituminous.

No regular order covering the reduction of 30c. per ton in the price of domestic coals has been received from Washington, but the shippers are billing all coal above ground on Apr. 1 at the new price.

Reports from the mining regions are encouraging. Notwithstanding the labor shortage which is in danger of becoming more serious because of the new draft call the latter part of this month, the mines in some quarters were able during March to increase their output. The seriousness of the labor situation has become such that operators are asking for the exemption of their men on the ground that their services are badly needed to keep up the coal production.

Stocks of the domestic coals at the loading piers show no apparent increase. Receipts have been about the usual quantity and the coal is moved quickly. There was some fear that there would be a suspension of water shipments due to threatened labor troubles, but this has been avoided, at least temporarily.

The only easiness in the steam hard coal situation is in rice and barley. These two sizes are plentiful but far from a drug on the market. Quotations remain firm and dealers meet with little difficulty in getting rid of their supply. A freer movement of bituminous would result in a freer movement of rice and barley.

The real estate interests in announcing an increase in rentals state as one of the reasons the cost of coal, which they say is nearly three times what it was two years ago.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buckwheat	4.45@5.15	5.10@5.85
Rice	3.90@4.10	4.10@4.85
Barley	3.40@3.65	3.10@4.10
Boiler	3.65@3.90	.....

Bituminous—The efforts of the railroads to get their fuel supply from certain operators at prices under those fixed by the Federal Fuel Administration are taking considerable attention in and out of the trade. The agitation is keen and shippers are being urged by some operators to write the President, Dr. Garfield, United States Senators and Congressmen protesting against such efforts. It is argued that the railroads, which themselves are now under Government control, are taking undue advantage of the operators and are denying proper distribution of cars to those operators who do not agree to give them coal at the lower prices. Unless the plan is stopped it is apparent that the operators who do not favor the railroads will either be forced out of business because of not being able to get cars or will have to get more for their coal to make up for the lack of production, which means that the consumer will have to pay more for his coal. Shippers claim that unless the authorities intervene and insist upon a proper

and equitable distribution of cars the situation next winter will be more serious than it was last winter. In addition to getting enough cars to supply the requirements of the railroad, the favored operator is getting sufficient cars to enable him to take care of his regular trade. This permits him to operate his mine nearly six days a week while the less favored operator is hardly able to work half time.

Taken as a whole the car supply along the Pennsylvania Lines last week averaged about 55 per cent., of which only about 5 per cent. was for regular business, the remaining 50 per cent. being for priority orders. Along the Baltimore & Ohio and the New York Central the car supply was reported somewhat better.

Shippers early this week received notice that the Government will permit the replacing of the cars seized by it during the past winter at the prices then in vogue if the same is desired by the consumer. This will result in much additional tonnage to many shippers, some of whom lost many cars through Government confiscation.

With nearly all contracts ended shippers expect that there will be more free coal available here.

BITUMINOUS PRICES

	F.o.b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite prices announced for April. Individual differential retained for present. Some evidence of zoning. Receipts of coal light. Dealers book many orders. Authorities reduce consumers' orders. Distribution plans still hazy. New freight tariffs. Expect fixed steam prices. Bituminous price rumors have not materialized. Supply still short. All a matter of cars. Zone plan slowly developing. Little contract business.

Anthracite—The new anthracite prices have finally been given out after several vexatious delays. The holding back of the prices caused much confusion and dissatisfaction among the retail trade especially. On the afternoon of Apr. 1 the largest shipping company verbally announced to all inquirers that the new prices had been decided upon and then quoted the March or winter rates less 30c. per ton on broken, egg, stove, nut and pea sizes, with no change in buckwheat and the smaller steam sizes. The next day these figures were withdrawn, then given out again, only to be followed by another withdrawal. Finally on Apr. 5 the prices were given to the trade as official, with the exception of broken, on which the 30c. reduction does not apply, but which remains at the price of $4.90 at the mines.

While dealers fully realize that sales were to be based on prices fixed by the Fuel Administration, many were unable to do business without a price and could not persuade their trade to order until they were definitely assured of a reduction from the winter rates.

The independent shippers continue to book orders at prices 75c. above the so-called company circular, and their trade apparently expect to pay that figure; but to date we have been unable to learn of any firm who confidently claims the 75c. premium will stand until Sept. 1. In fact all shippers seem to feel that their present rates are subject to further adjustment.

Another cause of much anxiety is the delay in starting April coal to this market. Practically little coal has been received here during the first week of the month, and one big company with large trade connections here has shipped none at all. There is a feeling that a new system of shipping on the zone plan is being seriously considered and that an entire readjustment of the sources of supply is being quietly worked out and placed in operation. It would appear that shippers whose coal does not reach this market by the most direct routes have hesitated in consigning here until a definite policy has been decided upon.

Uncertainty exists as to whether retailers will have their gross margin reduced, as it is understood was done in New York. When the present $2.50 margin was adopted here the Fuel Administration claimed it was a temporary arrangement; now it is pointed out that the $2.25 margin allowed in New York applies to a "short" ton of 2000 lb., while the margin here is on a "long" ton of 2240 lb. In proportion they are about equal and, although in an adjoining county it was reduced to $2.25, it is not believed there will be any change here for the present.

Dealers, most of whose business has increased since Apr. 1, 1916, are alarmed at the possibility of not receiving more coal during the present coal year than they did from Apr. 1, 1916, to Mar. 31, 1917, as it is understood to be the intention of the Committee of Fuel Distribution to figure on this basis.

As yet there has been no decision on prices of steam coals and all such sales are being made at the prices in effect for the last year. It is generally believed that the Government will fix the prices on these grades for the first time and that this decision will come when the contracts which have been drawn and sent to them for approval are acted upon.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—Prior to the first of the month there were many rumors of a change in the mines price, which served to further unsettle the trade. Even the fact that we are well into the second week of April does not serve to remove the uncertainty as to the price situation. The rumors were quite insistent that a reduction would be made, though it is hardly believed the Government would make such a move.

BALTIMORE

Many orders pouring in on retail anthracite men, but deliveries are light. Bituminous shortage again looms up. Jobbers still rather uneasy.

Anthracite—Under the public urging by the Maryland fuel administrator to purchase coal early, and the work of a number of coal men who are asking that customers place their orders, sending around agents to get old customers to sign up the Federal application blanks necessary before coal can be delivered, considerable business is going on the books of the fuel men. At present, however, there is little coal being delivered as the receipts here remain comparatively light and stocks are not such as to warrant hurrying of fuel to cellars. There is still some complaint over the fact that the new price schedule is a decided advance over the spring figures of last year, but the fact that the prices have the stamp of Government approval and sanction is saving the coal men much in the way of dispute and complaint.

Bituminous—The soft coal situation here is far from satisfactory. Many important industries are short again, and jobbing and mining interests have been asked in many cases to apportion the coal they are getting through irrespective of contract obligations. While the railroads are not as congested, apparently, the supply of empties at the mines except on priority orders is so far short of necessities that ordinary consumers are getting rather short shrift. Bitter complaint continues that many mines are left far short of requirements under the priority plan of distribution. Jobbers continue uneasy, as they are finding that they can not make the necessary mine contracts to fill the orders they have on their books as purchasing agents. While this situation may adjust itself in part, it seems sure already that all the business on the books of the jobbers will not be taken care of through ordinary contracts, and that fuel administrators will be called upon to fill some gaps for every public utility and emergency concern purchasing agents.

Lake Markets

PITTSBURGH

Zoning system being placed in operation. Byproduct coke ovens and steel mills well supplied with coal. Jobbers doing little thus far.

As a result of frequent conferences between representatives of the fuel administration and of the operators the new zoning system is becoming well understood, and a number of details applying to the Pittsburgh district have been settled. On account of its peculiar position, and the variety of coals produced in the district, it is given particular latitude in the matter of distribution.

The fuel administration has been laying particular emphasis upon the necessity for furnishing the byproduct coke ovens with full supplies of coal, results being quite satisfactory as with scarcely an exception the byproduct plants are in full operation. In practice the zoning system does not apply to the regular distribution of byproduct coal, as exceptions are made in the case of all regular movements. This is desirable because the byproduct ovens had already picked out the particular mixtures of coal they required for their best operation.

There have been no important complaints from the steel industry for several weeks as to supplies of coal, and it appears that on the whole the steel mills are receiving adequate supplies of both gas and steam coal. The mills are not operating at capacity in all cases, but restrictions are due to scarcity of cars for shipping finished steel rather than scarcity of either fuel or pig iron. Shipments of finished steel are approximately one-half greater than in January and February. A moderate amount of free coal is coming into the market. Jobbers are trying to get their business in shape under the new regulations but thus far have not had much opportunity to act. On the one hand, it has proved difficult so far to make arrangements with consumers whereby the jobber may charge them a commission for securing coal for them, while on the other hand operators have been indisposed to make concessions to jobbers, to give them a margin on sales they might make at the Government limits. The market remains quotable as follows: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, jobbers being permitted to charge 15c. extra when regularly constituted by consumers to make purchases for them.

BUFFALO

More bituminous, less anthracite in this market. Situation otherwise not much changed. Jobbers getting licenses. Anthracite price uncertain.

Bituminous—The contention of the local trade and especially of the jobbers is that if the car supply is made adequate all the regulations in regard to zones or anything else can be laid aside. The many rules sent out bewilder the shippers, and they are often so indefinite that the shipper is afraid to put a construction on them lest he make a mistake and lay himself liable to arrest.

The licenses are coming in, but so far only a few jobbers have them. The Government is exacting. If a shipper has had any connection with a mine as agent he must furnish absolute evidence that the connection has been given up before he can get his license. So it often happens that the application is held up till further evidence is furnished.

There is more and more likelihood, as the situation is sized up, that more bituminous is going to be needed in the anthracite trade than ever before. The difference in prices, allowing the Allegheny Valley thin-vein mines to charge more than Pittsburgh, is selling the latter coal much more freely than the valley coal; and it may make it necessary to reduce the latter prices voluntarily before long if the supply is increased much. As it is some shippers are getting quite as much coal already as they can sell.

Anthracite—The supply is adequate in small sizes only. The furnace sizes are always scarce at this time of the year, but they are almost wanting entirely now. This means that the consumers are trying to lay in a winter supply and are not able to get it. Prices are still uncertain, so that some shippers do not dare to take any orders for a definite price. No coal of any account is coming this way for the spring trade. The result is that the town is full of Canadian retailers, as eager for coal as they were last winter, but they are told to wait

DETROIT

Movement of bituminous coal into Detroit continues in good volume. Anthracite is not plentiful. Preparations for lake shipments under way.

Bituminous—Shipments of bituminous coal are now coming into Detroit freely. The movement maintains a volume, which offsets to a rather satisfactory extent the requirements of consumers, though practically all the coal is sold en route or before leaving the mines, and free coal on tracks continues wholly absent as a market factor.

With many of the city's large manufacturing plants working overtime on war

orders, the consumption needs of steam plants are large. Demand continues steady for steam coal. Few of the buyers have been able so far to make much of a start on acquiring reserve stocks, though the railroads and some of the utility companies are reported to be exerting an effort in that direction.

Slack is reported to be not as plentiful as some of the jobbers would desire, in order to provide for their customers' requirements. Lump is more plentiful, but complaints are heard that its quality is not as satisfactory as in previous years. Operation of the Federal Government's zone system of distribution has not been in effect during a sufficient interval for the dealers to have arrived at any definite conclusion as to merits of the plan. Some are inclined to believe that the district from which Detroit is entitled to receive bituminous coal will supply sufficient variety to meet the needs of most consumers, except in the matter of smokeless coal. Both Pocahontas and New River are eliminated from the city's supply and each was popular here.

Anthracite—Though reports received from the anthracite districts have been of an encouraging nature, and the Federal Fuel Administration is reported to have promised a good supply of anthracite, incoming shipments continue light. Many of the household consumers are now endeavoring to avoid next winter the troubles experienced in the last few months, but few of the retailers are able to fill orders for stove or egg sizes of anthracite. There is apprehension that the opening of navigation and resumption of lake coal shipments, within two weeks or so, will cause still further reduction.

Lake Trade—Plans are being arranged for handling a large volume of coal over lake routes early in the season. It is expected many cargoes will be afloat when navigation opens.

COLUMBUS

Considerable weakness in domestic grades has developed as the result of large production. Steam grades continue quite strong, and the market is expected to resume its wonted strength after the lake season opens.

The coal trade in central Ohio continues to show some weakness, especially in domestic sizes. Steam business is about as strong as usual, although a small tonnage is being peddled around which indicates a weaker condition than prevailed several months ago. With the opening of the lake trade at hand this condition is expected to pass away rapidly, and coal is expected to be in good demand all along the line. Prices are generally well maintained at the Government figures. Prospects are for an active lake trade and a good production from all Ohio fields.

The domestic trade is showing weakness because of the inability of some dealers to stock up to any great extent. Their storage space is limited and practically all have accumulated the desired excess stocks. Some dealers are also waiting for Pocahontas and West Virginia splints, which is especially true in sections where those grades have been popular in the past. It is believed that some of both grades will come into the local market, and some householders are waiting to see if they can get the fancy grades. Other users are stocking up for the coming winter on the basis of last year's consumption. On the whole the domestic trade is as active as usual for the time of the year.

Steam business is strong, as manufacturing plants are still stocking up to guard against emergencies. Railroads are taking a large tonnage, as many are accumulating surplus stocks. In fact many users, having learned a lesson from the past winter, are trying to get all the fuel possible. Public utilities are especially anxious over their future fuel supply.

Production has been quite good, although some falling off is reported due to lack of cars. This is explained by the fact that the Government has requisitioned many cars to move ore on the lower lake docks to mills prior to the opening of the lake trade. As a result the output in the Hocking Valley has been reduced to about 75 per cent, and the same percentage of reduction applies to other producing sections.

Prics of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.80	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Arrangements for supplying industrial demand occupy attention of trade, Federal control being a difficulty. Domestic storage promises to be unprecedented.

The beginning of another coal year, on April 1, and the desire of large industrial consumers of fuel to protect themselves more extensively than usual for their supply, has made the problem of the jobbers' and operators' agents that of arranging for means of satisfying their customers, rather than that of selling coal. Few operators are now in a position to promise anything definite, and most of them have already committed their normal output to customers under contract, although they have necessarily refrained from stipulating prices other than those which may be promulgated by the Government, and have also protected themselves by the usual provisions against uncontrollable circumstances. For one thing, the fact that favored industries will have prior claims to fuel should it be necessary to choose between consumers, regardless of contract, has to be considered in making contracts. Coal is now coming forward in increasing quantities, and the retail trade is taking more than usual, dealers reporting that consumers are ordering for immediate and early future delivery in greater numbers than ever before.

LOUISVILLE

Demand for all grades good, with supplies short and production light. Car supply causing much worry and showing no improvement. Labor scarce.

According to information received from Washington on Apr. 5 through the Federal Fuel Administration, prices have been set for the eastern and southeastern sections of the state, and while not quite so high as had been expected, are expected to influence summer stocking and result in some contract making. No prices have been made on western Kentucky coal as yet, but they are expected in a few days. Coal in the Harlan County district was reduced about 20c. a ton, whereas an increase had been expected which would have placed it on about the same basis as Blue Gem, which was reduced to the same price as other coal in the same district.

There has been a steady demand for domestic coal, which has improved somewhat due to a spell of cool weather. There has also been a good steam demand. Local dealers report that the efforts of the fuel administrators to get consumers to stock early is resulting in orders coming in which never came in before fall or midsummer. Due to the continued car shortage labor is steadily becoming scarcer, with production lighter, and supplies coming in only about equal to the demand, with very little surplus for stocking yards.

BIRMINGHAM

April ushers in renewed activity in the domestic market. Steam demand holds good, inquiries being plentiful and sufficient to prevent any accumulation. Production on about the normal basis of the past few weeks.

Retailers are beginning to get into the market more actively with the advent of April and a noticeable increase is seen in the stocks being accumulated on local yards. Secretary Duncan, of the Jefferson County fuel board, has furnished every dealer in the county with blanks on which to report his reasonable requirements of domestic coal for the 1918-19 season, based on his average sales for the past three years. With this information in hand the fuel board will lend its aid in seeing that yards are supplied with the tonnage needed.

There has been little if any easing off in the steam trade, reports indicating that there is a demand for the maximum tonnage now being produced, Government prices prevailing.

Complaint is heard at some operations that the change in the hours of the working day, effective Apr. 1, caused considerable loss in tonnage the past week, this trouble being particularly in evidence where miners lived some distance from their working places and arrived at the mines too late to make a full shift.

Coke

CONNELLSVILLE

Car supplies improved. Coke supplies now almost adequate. Large byproduct capacity coming in shortly. Market offerings light.

Car supplies were better last week than the preceding week, when they had dropped off somewhat, and this week has opened fairly well. Many operators had their output cut down last week by celebration of Easter week by foreign-born workmen.

For five weeks Connellsville coke shipments have been much greater than in the early part of the year, averaging about 75,000 tons a week more, or between 20 and 25 per cent. increase. As the coke takes various lengths of time to reach destination the furnaces have had improved supplies for different lengths of time, but all have been working much better for several weeks past. There are now few furnaces actually banked, but a number that are operating are not producing full tonnages, and there are a few furnaces entirely out of blast that would be blown in if a full supply of coke were absolutely assured.

Operations of byproduct plants are practically at capacity, and the attached furnaces have full production of pig iron. It should be noted that the increase in the production of pig iron is somewhat greater than the increase in the supply of coke, because with irregular and intermittent operation of furnaces the consumption of coke per ton of pig iron was above normal.

There has been particular difficulty in shipping Connellsville coke east, the Pennsylvania having rigid restrictions in force most of the time. For four days of last week operators were permitted to ship only 25 per cent. of their output east. Eastern consumers who are not being helped by the Government find themselves particularly short, as operators must first take care of the shipments decreed by the fuel administration.

The large increase that is to occur shortly in byproduct coking capacity is important. The Steel Corporation now expects to be making some coke at the Clairton plant by July 1, with full production from the plant a short time thereafter. This plant, now nearly completed, contains 640 ovens, and on the same schedule are the Cleveland and Lorain plants, with 180 and 208 ovens respectively, making 1028 ovens for the Steel Corporation, with fully 75,000 tons coke capacity a week. Independent interests will probably complete in the next few months fully 600 ovens, but some of these are out of the district supplied until now by the Connellsville region. There will be, in the country at large, a large excess of coke-making capacity, as the new ovens, with those completed since Jan. 1, 1917, involve a capacity of about 11,000,000 tons a year, while the increase in blast-furnace capacity requires only about 4,000,000 tons a year coke in addition to what was being produced in beehive and byproduct ovens prior to Jan. 1, 1917.

Offerings of coke in the open market are still limited and are usually only of coke in "restricted" cars. The market remains quotable at $6 for furnace, $7 for 72-hour selected foundry and $7.30 for crushed, over 1-in., per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 30 at 352,435 tons, an increase of 12,855 tons, and shipments at 383,708 tons, an increase of 50,171 tons. The increase in shipments was due to belated weighings at railroad yards, the coke having left the coke works in the previous week.

Birmingham—There continues a strong demand for every ton of coke that can be produced in this district, the only trouble being the lack of capacity to produce the greater tonnage needed and the difficulty in securing box-car equipment sufficient for its prompt movement. The Government prices of $6.75 at $7.50 for Big Seam, and $8 at 8.75 for the beehive product from the Blue Creek, Black Creek and Brookwood districts prevail. The construction of 154 byproduct ovens at the Fairfield works of the Tennessee Coal, Iron and Railroad Co., work upon which is to begin immediately, will add immensely to the producing facilities in this territory. This company now has 280 byproduct ovens in operation at the above point.

Middle Western

GENERAL REVIEW

Market quiet. Railroads refuse to buy at Government price and try to buy at less.

The position taken by the Middle Western railroads is that they should have their fuel supply at less than the Government prices. They decline to buy any coal or make contracts, and operate trains on the coal they have in stock or what they are able to get on contracts made last year that do not expire until April, 1919.

Regardless of the failure of the railroads to give any assistance to the operators, there has been little or no complaints, except in cases of mines that heretofore sold their coal for railroad fuel. Any high-grade, well-prepared Illinois or Indiana coal is sold without difficulty, at the Government figures, and the mines that have washers

and special preparation devices, such as conveyors and hand-picking tables, and are giving their attention to the cleaning of their products, are able to get the 20c. per ton premium for such service.

Market conditions as a whole have been easier for the past week than for some time, owing to the milder weather and the lessened congestion on the railroads. Retailers are receiving shipments faster than they can move the coal into their customers' bins. If the present policy of the railroads is long continued, no doubt there will be a decrease in production instead of an increase, for in order to keep up maximum tonnage throughout the spring and summer it will be necessary for the transportation companies to do their buying early and assume quickly the tonnage needed.

The car supply in Illinois for the week has been 70 per cent, and less for Indiana. The average for Illinois does not indicate that similar conditions prevail on all coal-carrying roads. In many instances mines have been able to run almost full time, in other cases less than half time has been noted.

CHICAGO

Market dull on all grades except the best Illinois and Indiana.

Any coal that is well prepared from southern Illinois is much in demand in this market and is taken readily by either the dealer or consumer, but some difficulty is experienced in marketing central Illinois and Fulton County Illinois. The limited car supply during the past week in Indiana has kept any large volume of coal from that state off the market, thereby preventing what would have otherwise been a troubled situation had mines been able to load to their full capacity.

Dr. Garfield's order granting the operator 20c. per ton advance on all coal that was cleaned by washing, picking tables or loading booms makes a spread of from $2.65 to $3. per ton on the sizes covered by the order. The Fuel Administration directs that in order to get the 20c. advance until Aug. 1, operators must obtain a license and place in the cars specially prepared two cards indicating that all the provisions of the rule have been complied with. It will not be possible for mines to charge the extra 20c. until they are able to show that they have proper cleaning facilities. In order to stimulate early buying, the Illinois fuel administrator, John E. Williams, has written to dealers at all Illinois points urging them to buy coal early and thus avoid a reoccurrence of last winter's hardships. He states that the dealer who buys in April will be more likely to get a choice connection than if he should delay until later.

Quotations in the Chicago market per net ton f.o.b. cars at mines, are given in the table above.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Smokeless					
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

State fuel administration office institutes a spring drive for coal. Orders being booked without regard to price. Coal receivers getting ready for business.

The spring coal drive is now in full swing at Milwaukee. Refusal of some coal dealers to accept orders for future delivery on the ground that they wished to ascertain what conditions they were to be called upon to face caused temporary confusion among consumers, who sought to follow the advice of State Fuel Administrator Fitzgerald to place orders for next winter's fuel by May 1 or as soon after as possible. The matter has been adjusted, however, and orders are now being booked by all dealers. The matter of price is left for future determination by those having the fuel situation in charge.

The coal docks are being put in readiness for the rush of coal which will follow the opening of navigation. Hoists are being repaired, channels dredged, and everything put in shape for prompt and efficient service in unloading cargoes. Yards which did not receive a pound of coal last year are expecting consignments this season.

Conferences have been held between coal receivers and grain shippers with the purpose of bringing about, if possible, some adjustment of freight rates which will lead to the shipment of more grain by way of the lakes during the season of navigation and thus furnish return cargoes to steamers which may bring coal to Milwaukee. The lack of return cargoes has deterred owners from sending their vessels here on that account.

ST. LOUIS

An unusually quiet market with no demand and prices far below Government maximum on some coals. Both steam and domestic sizes heavy. No new retail prices as yet. Car supply short. Anthracite shipments fair.

The market here is an extremely easy one. There is an abundance of coal from all fields, with no market to absorb it, and prices have gone to pieces on Standard grade. Certain restrictions on shipment of coal from the Standard field, partial embargoes against Chicago and the north, and the consuming zone orders in effect, have had a tendency to flood the local market. Coal in the past that has moved out into the Northwest has to find a market closer to home, and on account of failure to fix domestic prices there is no domestic buying and business is almost at a standstill. The steam market is being pushed and can not take up anywhere near the tonnage offered.

Some time during the present week the prices will be fixed for St. Louis, and this will have an effect on the entire state. Gregg & Co., who have been making a trade survey of retail conditions here for the last three months, show that it costs $1.45 per ton to sell coal at retail. This covers the cost of handling coal from the time it arrives at the dealer's track. The dealers are asking for an advance of 50c. a ton on all grades and a net profit on each ton of 51c., and it is expected that they will get about one half of what they are asking for. Fuel Administrator Crossley of Missouri and the St. Louis Fuel Committee are hearing the evidence in the case now.

Conditions in the Standard field are about normal. There are car shortages on the Illinois Central and M. & O., and the usual transportation troubles on some of the other lines, with considerable unbilled coal at some mines and other places idle on account of no orders.

The Mt. Olive field conditions are much better than anywhere else. The railroad contracts continue to take the tonnage, and such surplus tonnage of domestic sizes that are mined readily find a market in Chicago and the north to the preference of coal from the Standard field. Car supply in this field is good and working conditions splendid.

In the Duquoin field there is a car shortage on the Illinois Central, but considerable railroad equipment for railroad coal is furnished and this has kept the mines going fairly good.

In the Carterville field of Williamson and Franklin Counties there continues to be a car shortage on the Iron Mountain R. R. There has at times been a little unbilled coal at some mines on account of foreign equipment and restrictions, but in a general way this tonnage finds a ready market. Working conditions are good and many mines are sold up for a considerable time ahead.

The prevailing prices here are the circular, which is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 2 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 3 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 4 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 5 nut	2.15@2.40	2.15@2.40	.....
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	$2.85@3.00	$2.85@3.00	2.85@3.00
No. 2	2.85@3.00	2.85@3.00	2.85@3.00
No. 3	2.85@3.00	2.85@3.00	2.85@3.00
No. 4	2.85@3.00	2.85@3.00	2.85@3.00
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin County rate is 87½c.

Other fields, 72½c.

General Statistics

BALTIMORE & OHIO

The following is a statement of the coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of January, 1918, as compared with the corresponding month of the previous year:

	1918 Tons	1917 Tons
Coal	2,712,573	2,959,434
Coke	213,250	290,986
Total	2,925,823	3,250,420

CHESAPEAKE & OHIO

The comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for the month of February, 1918, and the two months ending Feb. 28, 1918, is as follows:

COAL

TO	February 1918	February 1917	Two Months 1918	Two Months 1917
Tidewater (bituminous)	484,631	512,951	816,086	1,025,903
East (bituminous)	358,153	250,925	680,703	524,395
West (bituminous)	1,142,958	856,479	1,982,372	2,041,895
Company's fuel (bituminous)	181,849	186,464	369,857	394,168
From connections (bituminous)	99,806	115,147	212,283	283,825
Total	2,267,397	1,921,966	4,061,301	4,270,186
Anthracite	2,792	626	6,262	1,344
Total coal movement	2,270,189	1,922,592	4,067,563	4,271,530

COKE

TO	February 1918	February 1917	Two Months 1918	Two Months 1917
East	24,124	12,127	45,662	27,623
West	18,246	22,137	36,443	47,649
Total	42,370	34,264	82,105	75,272
From connections	2,320	6,033	8,235	12,385
Total coke movement	44,690	40,297	90,340	87,657